Tanzania: Southern Highlands Food Systems

Rice Value Chain Analysis (Main Text)

Consultants’ Report (Main)
Ian Lewis and R Trevor Wilson
15 October 2013
Captions for Front Cover Illustrations
(All Photographs by Trevor Wilson)

Clockwise from top left:

Newly transplanted rice: Pawaga near Iringa, 26 August 2013

Variety IR 03A 2621 approaching maturity: Kyela in Mbeya Region [photograph courtesy of IRRI]

Large scale decorticating and grading mill: Raphael Company, Uyole, Mbeya, 23 August 2013

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TUTAFANYA NINI? WHAT FAO CAN DO

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INTRODUCTORY NOTE

A first edition of this Rice Value Chain study, written by Ian Lewis, was provided to FAO in November 2012. It was subsequently decided that the report should be strengthened by the addition of additional information and that a rice market survey and analysis would also be incorporated in the document. Trevor Wilson, who had previously worked with SHFS on Red Meat and White Meat Value Chains and had been contracted to undertake a Soya Bean Value Chain analysis led the additional rice studies in parallel with that of soya beans.

ACKNOWLEDGEMENTS

Thanks are due first to all those participants in the rice value chain who agreed to meet and have discussions with the Consultants (having for the most part met and had discussions with innumerable predecessors) and sharing their views as well as their hopes and fears with them: many of these are listed in Annex 3 which provides an inventory of the people met during the course of the study.

An extremely large number of documents have been written on rice and the rice value chain in Tanzania. This report has drawn deeply on these earlier documents.

Both Consultants contributing to this report thank Michael Winklmaier, Chief Technical Adviser of the Southern Highlands Food Systems Programme and his office staff for all the help provided over the course of the study. Trevor Wilson thanks Diana Templeman, FAOR Tanzania for her support in making the second part of the study possible, Joan Kimirei, National Consultant for assistance during an extended trip up-country and Peter Jimbuku driver extraordinary and general factotum.

CURRENCY EXCHANGE RATE

US$ 1.00 = Tanzania Shillings (TSh) 1600 approximately in September 2013
### ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACDI/VOCA</td>
<td>Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance</td>
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<tr>
<td>AfricaRice</td>
<td>Africa Rice Centre (formerly the West Africa Rice Development Association (WARDA))</td>
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<td>AKF</td>
<td>Aga Khan Foundation</td>
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<td>AKIRIGO</td>
<td>Association of Kilombero High Quality Rice Growers</td>
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<td>ALM</td>
<td>Agricultural Sector Lead Ministries</td>
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<td>ARI</td>
<td>Agricultural Research Institute</td>
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<tr>
<td>ASA</td>
<td>Agricultural Seed Agency</td>
</tr>
<tr>
<td>ASARECA</td>
<td>Association for Strengthening Agricultural Research in Eastern and Central Africa</td>
</tr>
<tr>
<td>ASDP</td>
<td>Agricultural Sector Development Programme</td>
</tr>
<tr>
<td>ASDS</td>
<td>Agricultural Sector Development Strategy</td>
</tr>
<tr>
<td>AVRDC</td>
<td>World Vegetable Research Centre (acronym from previous title of Asian Vegetable Research and Development Centre)</td>
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<tr>
<td>BRELA</td>
<td>Business Registrations Licensing Agency</td>
</tr>
<tr>
<td>CAMARTEC</td>
<td>Centre for Agricultural Mechanisation and Rural Technology</td>
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<tr>
<td>CET</td>
<td>Common External Tariff</td>
</tr>
<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
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<tr>
<td>CIAT</td>
<td>Centro Internacional de Agricultura Tropical (International Centre for Tropical Agriculture)</td>
</tr>
<tr>
<td>CRDP</td>
<td>Cooperative Rural Development Bank</td>
</tr>
<tr>
<td>DfID</td>
<td>Department for International Development (United Kingdom)</td>
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<tr>
<td>EAC</td>
<td>East African Community</td>
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<tr>
<td>EAGC</td>
<td>Eastern Africa Grains Council</td>
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<tr>
<td>EBT</td>
<td>Exim Bank (Tanzania)</td>
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<td>FBO</td>
<td>Faith Based Organizations</td>
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<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
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<tr>
<td>FFS</td>
<td>Farmer Field School</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GOT</td>
<td>Government of Tanzania</td>
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<tr>
<td>IITA</td>
<td>International Institute of Tropical Agriculture</td>
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<td>IPM</td>
<td>Integrated Pest Management</td>
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<tr>
<td>IRRI</td>
<td>International Rice Research Institute</td>
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<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>KATC</td>
<td>Kilimanjaro Agricultural Training Centre</td>
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<tr>
<td>KATRIN</td>
<td>Kilombero Agricultural Research and Training Institute</td>
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<tr>
<td>KPL</td>
<td>Kilombero Plantations Limited</td>
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<tr>
<td>M4P</td>
<td>Making Markets Work for the Poor</td>
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<tr>
<td>MAFC</td>
<td>Ministry of Agriculture, Food Security and Cooperatives</td>
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<td>MFI</td>
<td>Microfinance Institutions</td>
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<td>MITM</td>
<td>Ministry of Industries, Trade and Marketing</td>
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<tr>
<td>MKUKUTA</td>
<td>National Strategy for Growth and Poverty Reduction (acronym from Swahili title)</td>
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<td>MLFD</td>
<td>Ministry of Livestock and Fisheries Development</td>
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<td>MMI</td>
<td>Ministry of Water and Irrigation</td>
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<td>NAFACA</td>
<td>Tanzania Staples Value Chain (‘nafaka’ = grain in Kiswahili)</td>
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<td>NAFCO</td>
<td>National Agricultural and Food Corporation</td>
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<tr>
<td>NAIVS</td>
<td>National Agriculture Input Voucher Scheme</td>
</tr>
<tr>
<td>NALPIG</td>
<td>National Agriculture and Livestock Extension Policy and Implementation Guidelines</td>
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<tr>
<td>NBC</td>
<td>National Bank of Commerce</td>
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<td>NBS</td>
<td>National Bureau of Statistics</td>
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NGO Non-Governmental Organization
NMB National Microfinance Bank
NMC National Milling Corporation
NORAD Norwegian Agency for Development Cooperation
NRDS National Rice Development Strategy
NSCA National Sample Census of Agriculture
OCHA United Nations Office for the Coordination of Humanitarian Affairs
PASS Private Agricultural Sector Support Programme
PHS Plant Health Service
PMO-RALG Prime Minister’s Office-Regional Administration and Local Government
RATIN Regional Agricultural Trade Intelligence Network
RLDC Rural Livelihood Development Company (Swiss Agency for Development and Cooperation (SDC))
RUDI Rural Urban Development Initiative
R&D Research and Development
SACCOS Savings and Credit Cooperative Societies
SERA Tanzania Policy Project (USAID)
SDC Swiss Agency for Development and Cooperation
SHIDEPHA Services Health and Development For People Living Positively with HIV/AIDS
SILC Savings and Internal Lending Communities
SME Small and Medium Enterprises
SPS Sanitary and Phytosanitary
SRI System for Rice Intensification
TAP Tanzania Agricultural Partnership
TASU Tanzania Agriculture Scale Up programme
TAZARA Tanzania-Zambia Railway
TBS Tanzania Bureau of standards
TFDA Tanzania Food and Drugs Authority
TIN Tax Identification Number
TPB Tanzania Postal Bank
TPRI Tropical Pesticides Research Institute
TRA Tanzania Revenue Authority
USAID United States Agency for International Development
VSO Voluntary Service Overseas
WRS Warehouse Receipts System

**GLOSSARY OF KISWAHILI WORDS AND PHRASES**
(most of these in the text are placed between single quotation marks)

chenga broken rice (the lowest quality in the local grading system
duka a shop (plural = maduka)
kilimo kwanza agriculture first (a Government development policy)
mchele milled rice
mpungu the growing rice crop and also the unmilled grain or paddy
panya rat (in the context of this report a bush track used for informal export of rice)
wali cooked rice (mchele)
EXECUTIVE SUMMARY

Rice is the third most important food crop in Tanzania after maize and cassava. According to official data annual production averages about 1.35 million tonnes. Production doubled between 2001 and 2012 but this was due to increased area and not to increased yield. Most rice is grown by smallholders under rainfed conditions (74 per cent of the planted area) with irrigated (20 per cent) and large scale production (6 per cent) being of lesser importance. The Government of Tanzania has prioritized rice through its National Rice Development Strategy (NRDS) which seeks to double rice production again by 2018 in order to provide food security and the possibility of export to neighbouring countries.

Rice is used almost entirely as human food. About 30 per cent of rice output is used by the producing household as food. Almost all of the remainder is taken up by the domestic market and mostly in the larger urban areas. Greater Dar es Salaam is the principal end-market with about 60 per cent of consumption and for which Mbeya and Morogoro are the main sources of supply. Tanzanians generally prefer aromatic rice and most consumers purchase rice loose from traditional retailers in street or farmers’ markets. Supermarkets selling prepacked rice in are as yet a small part of food retailing. Consumers shift from maize, cassava and sorghum to rice (for boiling) and wheat (as bakery products) as they become urbanized and as incomes rise. In the twenty first century rice consumption has increased from 20.5 kg in 2001 to 25.4 kg in 2011 per person per year.

Only 13 per cent of small scale farmers sell rice as most is produced because most is for their own consumption. Some 42 per cent of all rice produced (more than any other food crop) is marketed, however, due to the influence of large scale growers. Tanzania has not been self-sufficient in rice for many years and there were high levels of imports during the first years of the twenty first century until an import tariff of 75 per cent was imposed in early 2005. Imports were reduced in consequence and this provided the impetus for a major domestic increase in rice production (imports represented 16.5 per cent of domestic production in 2001-2004 but dropped to 5.2 per cent in 2005-2011). Paradoxically, exports to neighbouring countries – mainly Burundi, Kenya, Rwanda and Uganda -- were about 5 per cent of production whilst rice was being imported.

Imports were encouraged in part because local rice prices in Dar es Salaam was considerably higher than world prices. Rice prices to both producer and consumer vary throughout the year being low in the glut period of 3-4 months around and immediately after harvest and higher for 9-8 months as less rice is moved on to the market: a high-to-low ratio of monthly prices is 1.23 in Dar es Salaam. This variation provides the rationale for more storage capacity which is generally inadequate in rural areas.

Demand for rice in Tanzania is projected to triple by 2020 and a substantial and growing deficit from 1.15 million tonnes in 2009 to 2.84 million tonnes in 2020 is forecast. These trends are expected to continue past 2025. Rice production grew at an average annual rate of just under 7 per cent from 2001 to 2011. Rapidly growing domestic demand means, however, if present trends continue that the country will find it difficult to produce a surplus for export surplus in rice. Were the rice sector to achieve a 10 per cent annual growth rate however there would be surpluses for export whereas a growth rate 5 per cent would result in increasing trade deficits.

Traditional small scale rainfed production (either lowland flood or upland dry) is the predominant system accounting for about 74 per cent of the national rice area. There is little use of technology: saved seeds are the planting material, there is minimal fertilizer use, limited use is made of the Warehouse Receipts System (WRS) for storage and spot prices on the local market are the norm. Improved small scale rainfed production occupies about 20 per cent of the planted area. Use may be made of new cultivars, hand planting in rows is practised, there is some irrigation, more use of fertilizer and more storage and trading using WRS. Large scale integrated production by commercial farms (backed by investment capital) occupies 6 per cent of Tanzania’s rice area. These enterprises are also involved in other chain activities including provision of inputs and services to out growers, storage, milling and distribution to urban wholesalers.
Among the strengths of the sector are the inherent high quality -- but low yielding – aromatic rice that is in demand in Tanzania and neighbouring countries, a fitting natural growing environment (climate, soil and water) and emerging large scale producers and traders with expanding smallholder schemes.

In opposition to the strengths are a number of critical weaknesses. Paddy yields average only 1.5 t/ha compared to 2.5 t/ha for Africa as a whole and 4.4 t/ha in Asia. Low output is linked to predominantly rainfed production, limited adoption and availability of improved cultivars, little use of fertilizers, traditional planting techniques and limited areas of irrigation. Smallholder paddy production has high labour requirements which coupled with very little mechanization results in high production costs. The value chain has little horizontal or vertical integration and is inefficient and transaction based. The chain operates on a supply push and not a demand pull basis. There is limited information sharing and no overall governance. Sub chains are production and milling, trading and distribution through wholesalers and marketing and retailing. Little value is added to the basic product from production to consumption. There is little trust in business transactions which are generally conducted on an informal basis without contractual obligations: this adds to business costs and is a major impediment to improved governance and the development of value added activities. Poor transport infrastructure results in high transport costs, reduces price competitiveness and means lower returns to growers. Storage capacity in rural areas is very limited. Outdated machinery in small mills produces high proportions of broken rice and there is limited grading of milled rice that might meet specific customer needs. Finance, credit and insurance are difficult to obtain. Smallholder producers are often remote from markets and have very limited options in terms of buyers, information and services. Data on the sector is of poor quality. Government policies are slow in implementation due to limited human, financial and physical resources. There is rice industry association covering all participants in the chain to guide strategic development and exert pressure on government policy.

Opportunities drive growth and change. Domestic demand for rice continues to expand led by Dar es Salaam. Tanzania continues to be a net importer of rice but there is a growing export demand in neighbouring countries. Emerging collaboration between smallholders and large private growers (principally via outgrower schemes) brings benefits to both parties: smallholders will increase their productivity and gross margins, gain access to a greater area of land and have a more assured future and the large farms will make more economic use of their equipment. Government exhibits a positive attitude to rice development as indicated by the National Rice Development Strategy (NRDS) and actively promotes private investment.

The main threats to the sector, nonetheless, are changes in government policies on export bans and import tariffs that reduce customer and investment confidence. These and other aspects of the business enabling environment determined by government need to provide confidence for both smallholders and the large producers. The problems associated with business competitiveness, that include many of the indicators used by the World Bank, need to be solved as does the question of land tenure which has an impact on both smallholders and large private investors.

The Vision for the rice sector could be:

By 2025, a sustainable, environmentally sensitive, more productive, more competitive and more profitable rice sector will deliver increased output for internal consumption and for export and contribute to reduced poverty, improved food security and a better quality of life for all Tanzanians

The realization of the Vision requires that a number of strategies be adopted:

- Increased rice production (key strategy elements are large private sector companies focussing on production and processing and trading companies, and smallholder interventions
Increased rural storage capacity (key strategy elements are community-based grain storage, commercial grain storage, reporting of stored grain volumes, and expanded use of WRS);

Improved functioning and performance of the rice value chain and marketing (key strategy elements are large private sector companies involved in production and provision of commercial services have the ability to transform the value chain over time, train chain stakeholders in value chain management, consumer research, train to build trust and a greater understanding amongst stakeholders of the advantages of contracting business transactions along the chain, a scoping study to identify opportunities to add value and how these can be implemented in rural areas in particular, understanding regional export markets, the competitive situation, customer requirements and the requirements for market development);

Industry wide body or alliance (key strategy element is scoping the need for and role of the industry wide body or alliance); and

Enhancing the business enabling environment (key strategy element is that the SERA Project (through USAID), the World Bank and a number of donors are already actively involved in providing advice on these issues to Government.

FAO has major strength and experience in training and in understanding agroindustry business models in developing countries. It is thus recommended that FAO’s focus be on two broad areas:

Training
• training and skill development for smallholders in topics from agriculture to business management and including contracting,
• training stakeholders in value chain management, and
• training to build trust and greater understanding amongst stakeholders of the advantages of contracting business transactions along the chain; and

Consultancy studies to research critical issues related to agroindustry development in the rice sector
• review of existing smallholder outgrower schemes and develop solutions to current bottlenecks,
• review of how to increase the availability of grain storage in rural areas,
• scoping study to identify opportunities for adding value and how these can be implemented especially in rural areas, and
• consumer research in Dar es Salaam.
1. INTRODUCTION

1.1 Background of the Study and Objectives

The Southern Highlands Food Systems (SHFS) Development Programme comprises two projects – URT 132 “Food Systems Development in Tanzania” and URT 133 “Advisory Services Capacity Development in Support of Food Security in the United Republic of Tanzania” that were combined in 2010 with the object of improved implementation. Both projects are closely aligned with the Government of Tanzania’s Agricultural Sector Development Strategy (ASDS) that is designed to put in place a policy environment more favourable to private investment in agriculture and provide sector-specific policies having a bearing on agricultural productivity and profitability.

The overall project outcome for URT 132 is defined as “Public and private organisations and food chain actors have improved capacity to coordinate, plan and support food chain and business development in the rice, maize, edible oil and red meat sub-sectors of the Southern Highlands”. In order to achieve this outcome the project has five major outputs:

- Output 1: Sub-sector specific strategies and priorities identified;
- Output 2: Public-private sector coordination and capacity strengthened;
- Output 3: Best practices for new market mechanisms promoted;
- Output 4: Food-chain innovation capacity strengthened; and
- Output 5: Strategies to improve capacity utilization of agroprocessing facilities identified.

The envisaged outcome for URT 133 is “Enhanced capacity of advisory service providers and farmers in farm management and marketing to enable them to respond better to market opportunities”. This project is also expected to contribute to Government restructuring efforts by focussing on market oriented extension. The interventions are expected to enhance farm profitability and competitiveness and the income derived from farming operations through four outputs:

- Output 1: Awareness of policy makers and programme managers to market oriented agricultural extension and knowledge of “good practices” heightened and realized;
- Output 2: Capacity of advisory service providers in farm management and marketing at central, district and ward levels developed;
- Output 3: Capacity of smallholder farmers and farmer groups developed; and
- Output 4: Linkages between producer groups, private agricultural service providers and financial institutions and market outlets established.

Value chain analysis thus cuts across both projects and their outputs.

The major objectives of the study were to:

- identify strengths and bottlenecks in production, processing, marketing and the institutional environment of the Tanzania rice industry and establish links among performance drivers along the value chain with efficiency/competitiveness issues;
- present and take part in a validation workshop with public and private sector stakeholders on the results of the assessment;
- propose strategic interventions to government and private sector stakeholders regarding the improvement of organization and performance of the rice value chain with a view to increasing efficiency and competitiveness; and
- prepare a report on the “Tanzanian Rice Value Chain Analysis” in a publishable format.
1.2 Methodology

A mission to Tanzania was undertaken in the period July-August 2012 in support of the Food and Agriculture Organization (FAO) Programme “Tanzania Southern Highlands Food Systems”. The Mission was conducted according to Terms of Reference furnished by FAO (Annex 1). During a comprehensive work programme (Annex 2) meetings and discussions were held with stakeholders across the whole spectrum of the sector (Annex 3) and many documents were consulted (Annex 4).

In brief the methodology of the study comprised:

- an analysis and review of the rice subsector and value chain in Tanzania using a value chain analysis framework;
- a description (including mapping), analysis and review of the value chain as a whole and each individual stage covering production, processing, transport, marketing and end users in terms of performance and competitiveness against relevant criteria and an identification of the key drivers and issues having an impact on the performance of the chain;
- a review of relevant reports and studies coupled with interviews with actors at each stage of the chain in order to gain a better understanding of their roles and the key issues influencing their performance and the chain as a whole and opportunities for improvement and adding value;
- further interviews with relevant government agencies to understand key policies and their implementation and other aspects of the enabling environment and its impact on the sector;
- a SWOT analysis of the key strategic issues and development of relevant improvement and development strategies and options for evaluation and the construction of recommendations covering both the private and public sector; and
- present the analysis, findings and strategic recommendations in a report for publication.

The range and breadth of the literature sources in Annex 4 show the wealth of data on the rice value chain. Much of it, however, is qualitative. There is such disparity among quantitative data sources that its reliability and indeed its usefulness is open to doubt: data presented in this report should thus be considered indicative rather than definitive. Inconsistencies in the quality of official data apply particularly to production, export and import information. Where credible detailed analysis has been undertaken and revisions proposed outside government the data have been used in this report in preference to official sources.

1.3 Brief Overview of the Value Chain

Rice\(^1\) is the third most important food crop in Tanzania after maize and cassava. Official data indicate that total production currently averages about 1.35 million tonnes. Rice is grown throughout most of the country: Coast, Morogoro, Tabora, Mbeya, Mwanza, Shinyanga, and Arusha Regions each produce in excess of 100,000 tonnes. Almost 20 per cent of farmers are involved in rice production. Most rice is grown by smallholders under rainfed conditions but some small farmers grow 2.0-2.5 ha under irrigation in schemes that are often initiated and controlled by government. Larger farms have larger areas under irrigated cultivation but large scale commercial rice farming is limited to a few private firms who bought their land when the large scale National Agricultural and Food Corporation (NAFCO) schemes were privatized.

\(^1\) Rice is the English generic term for the growing crop (although “paddy” is also used in this context), unmilled grain (also sometimes known as paddy), milled grain and the cooked and ready-to-eat product: in Kiswahili the crop and unmilled grain are ‘punga’, the milled grain is ‘mchele’ and the cooked product is ‘wali’. 
In recent years, the Tanzanian government, private sector, and civil society have demonstrated a sustained commitment to realizing Tanzania’s agricultural potential. The Agricultural Sector Development Programme (ASDP) 2006-2015 of the Government of Tanzania (GOT) is part of the broader National Strategy for Growth and Poverty Reduction (known from its Kiswahili acronym as MKUKUTA). A private sector initiative to invigorate agriculture through the ‘kilimo kwanza’ (“Agriculture First”) campaign (Box 1) was endorsed by the government in 2009.

**Box 1: ‘KILIMO KWANZA’ – The Principal Points and the Ten Pillars**

**Principal Points**

A national resolve to accelerate agricultural transformation
Agriculture as an economic priority of Tanzanians
Not a new strategy but a catalyst for the implementation of ASDP with additional features
In contrast to the past, the private sector to be the lead implementing agent of ‘kilimo kwanza’
Formulated by Tanzania National Business Council, a forum for public-private dialogue

**Ten Pillars**

1. Mobilize political will and commitment of all Tanzanians to ‘kilimo kwanza’
2. A new Tanzanian Agricultural Development Bank as a major pillar of financing for ‘kilimo kwanza’
3. Emphasize good governance, better coordination and monitoring and evaluation
4. Prioritize what is produced and marketed with food crops given top priority
5. Land access and tenure security
6. Incentives to attract and retain private sector investments in agriculture
7. Establish industries for backward and forward linkages and to provide added value
8. Science, technology and human resources
9. Infrastructure development

Government has prioritized rice through its National Rice Development Strategy (NRDS). This seeks to double rice production by 2018 to provide food security and the potential for export to neighbouring countries. NRDS aims to improve seed cultivars and input supply, the availability of irrigation, marketing, Research and Development (R&D) and agricultural credit. The major programmes and policies include:

- fertilizer and seed subsidy and seed R&D;
- infrastructure development (irrigation and roads);
- an import tax of 75 per cent on milled rice for mainland Tanzania; and
- removal of the export ban during 2012.

The value chain comprises participants from production to consumption (Figure 1).
2. END MARKETS

2.1 National Market

There are active markets for paddy and rice throughout the year. Both products store well and will keep from one year to the next and are therefore extensively traded. Rice in Tanzania is mostly sold to consumers as polished milled rice. The preferred type for consumption is aromatic long grain rice but there is also demand for sticky white long grain rice. Very few other products are available although there are limited supplies of brown rice and rice flour. Value added products such as rice crackers, as produced in Thailand, appear to have no place on the Tanzanian market.

Rice is a staple food and is consumed in both urban and rural areas. The urban area of greater Dar es Salaam is the principal end market and accounts for about 60 per cent of national consumption, Mbeya and Morogoro Regions being the main sources of supply. Dar es Salaam has Tanzania’s highest Gross Domestic Product (GDP) per caput (US$ 1741 compared to the national US$ 1471 in 2010), the highest urban population and the third largest total population in the country. Rural consumers include smallholder rice farmers who retain about 370 kg of their production for consumption by their own household of about five persons.

Consumers usually purchase rice loose from bulk sacks from traditional retailers in small shops or at farmers’ markets (Figure 2). Quality differentiation is limited mainly to the amount of broken rice present (e.g. 80 per cent whole grain, 20 per cent broken grain), to whether it is aromatic or non-aromatic rice (Figure 3) and to whether it is local or imported. There is no significant premium for <5 per cent broken rice as demand is largely at 20 per cent broken. Processors therefore mix broken and unbroken rice to achieve 20 per cent broken and they also mix non-perfumed with perfumed rice as there is little demand for the former. Tanzanian rice achieves a premium over imported rice. There are also regional (“place-of-origin” or “geographic”) preferences and rice is often labelled as being from regions that are perceived by consumers as offering special qualities:

- Kyela rice is viewed as best quality followed by that from Mbeya;
- Morogoro rice is viewed as good quality but inferior to Kyela and Mbeya;
- Shinyanga rice is viewed as low quality as it is not aromatic and historically has had a large amount of foreign matter.

Figure 2 Rice for sale at typical retail outlets
There is some limited branding (Figure 4) but this is still not generalized. Supermarkets are a recent (first one opened in 2001) and still a small part of food retailing with perhaps only a 10-15 per cent share in Dar es Salaam and even less in other urban centres. The scale of operations is still small and most outlets have limited Stock Keeping Units). An inventory of supermarkets in Dar es Salaam includes the locally owned Shrijees (5 stores) (Figure 4), Nakumatt (1 store; 4 planned), the Kenyan owned Uchumi (2 stores), the locally owned Village Supermarket (3 stores) and the South African Shoprite (3 stores). The food service market is an important end user of rice and comprises several subsectors including traditional stalls and cafes selling cooked food on roadsides, fast food outlets with an American style format in Dar es Salaam and other large cities, western style restaurants and hotels and resorts. Institutional markets include the military, hospitals and educational establishments.

Rice, which is used almost solely for human consumption, is second to maize in calorie supply for Tanzanians. Annual per caput rice consumption increased at 6.15 per cent per annum due to population growth (2.88 per cent) and an increasing preference among higher income urban households for rice, from 20.5 kg in 2001 to 25.4 kg in 2011 (Table 1) and represented 8 per cent of calorific intake. In the same period maize consumption decreased. Tanzania’s steady economic growth has stimulated both increased domestic production of rice and imports and, as incomes rise, rice (and wheat) becomes preferred over sorghum and maize as it is easy to prepare and is a symbol of increased social and economic status.
Figure 4 Shrijee Supermarket branded rice ("Mbeya/Moro Super Grade retailing at TSh 5000 per 2 kg) and the Shrijee supermarket outlet at Oyster Bay, Dar es Salaam

Table 1 Estimates of Tanzania rice consumption and production, 2001-2011 (tonnes milled rice)

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption</th>
<th>Imports</th>
<th>Exports</th>
<th>Seed</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>824 447</td>
<td>139 053</td>
<td>4 768</td>
<td>34 000</td>
<td>724 162</td>
</tr>
<tr>
<td>2002</td>
<td>857 805</td>
<td>76 530</td>
<td>9 055</td>
<td>37 000</td>
<td>826 610</td>
</tr>
<tr>
<td>2003</td>
<td>888 197</td>
<td>189 621</td>
<td>11 006</td>
<td>37 000</td>
<td>746 582</td>
</tr>
<tr>
<td>2004</td>
<td>924 299</td>
<td>181 986</td>
<td>2 487</td>
<td>42 000</td>
<td>786 800</td>
</tr>
<tr>
<td>2005</td>
<td>976 646</td>
<td>67 495</td>
<td>10 618</td>
<td>45 000</td>
<td>964 769</td>
</tr>
<tr>
<td>2006</td>
<td>1 033 891</td>
<td>90 480</td>
<td>10 093</td>
<td>43 000</td>
<td>996 504</td>
</tr>
<tr>
<td>2007</td>
<td>1 084 885</td>
<td>45 187</td>
<td>20 176</td>
<td>43 000</td>
<td>1 102 874</td>
</tr>
<tr>
<td>2008</td>
<td>1 132 699</td>
<td>64 147</td>
<td>34 197</td>
<td>55 882</td>
<td>1 158 631</td>
</tr>
<tr>
<td>2009</td>
<td>1 177 027</td>
<td>39 607</td>
<td>48 218</td>
<td>44 483</td>
<td>1 230 121</td>
</tr>
<tr>
<td>2010</td>
<td>1 250 465</td>
<td>1 493</td>
<td>62 239</td>
<td>42 503</td>
<td>1 353 714</td>
</tr>
<tr>
<td>2011</td>
<td>1 332 078</td>
<td>32 884</td>
<td>76 260</td>
<td>47 782</td>
<td>1 423 236</td>
</tr>
</tbody>
</table>

Source: Stryker and Amin 2012

Indications from the National Sample Census of Agriculture 2002-2003 (NSCA) show that rice is more commercialized than other staple crops as 42 per cent of production is marketed compared to 28 per cent for maize and 18 per cent for sorghum. The figures may, however, be misleading as they can be distorted larger rice growers account for the bulk of sales. The NSCA data for small scale farmers found that only 13 per cent of growers sold any rice because much of the rice produced by subsistence small holders is for their own consumption.

Imports were significant in the early 2000s before a duty of 75 per cent was imposed in early 2005. This caused a drop in imports and was the basis for a major increase in rice production. Although there are still considerable imports from Pakistan, India and Vietnam. Imports represented 16.45 per cent of domestic consumption in the period 2001 to 2004 but only 5.2 per cent for the period 2005 to 2011. Reduced imports means that domestic prices are less subject to volatility in world prices but more vulnerable to variations in domestic production. Except for a brief period in 2008 rice prices in Dar es Salaam have been higher than world prices (Figure 5) which means that Tanzanian consumers are paying a significantly higher price than consumers in many other parts of the world.
Tanzania is a regular importer of rice mainly because the domestic wholesale price in all markets is significantly higher than the international price of Thai Super A1 broken rice. Lowest local prices are at Songea which is a rice surplus zone, followed by Singida which is near the production zones of Mwanza and Shinyanga with highest prices being in Dar es Salaam and other rice deficient markets (Figure 6). The gap between prices in Songea and Dar es Salaam is almost US$100/tonne.

Figure 6 Rice prices in Tanzania regional markets compared to the Thai market, 2003-2007 (Minot 2010)
Rice prices vary seasonally and provide much of the rationale for storage and helping to determine the time at which a producer decides to sell some or all the stored crop. Prices are generally lowest immediately after harvest when supply is at its greatest (Figure 7). The highest-to-lowest monthly price ratio varies between 1.23 in Dar es Salaam and 1.33 in Mtwara.

Figure 7 Seasonal variation in rice prices in Tanzania regional markets, 2003-2007 (Minot 2010)

Domestic demand for rice grew at an annual average of 4.92 per cent over the period 2001-2011. Demand is expected to increase threefold over the period 2010 to 2020 from a combination of population growth (3 per cent per annum), increased affluence (economic growth at 7 per cent per annum) and continued urbanization (5 per cent per annum) (Figure 8).

Figure 8 Growth in national demand for rice, 2010-2020 (BMGF 2012b)
2.2 Export Markets

Exports represented only about 5 per cent of rice production during the 2000s. Exports are principally to neighbouring countries including Uganda, Rwanda, Kenya and Burundi (Table 2) and occasionally to Malawi and Zambia. Tanzania official export figures are wildly at variance with official data from the importing countries. Informal trade is quite considerable, certainly under-reported and takes place via ‘panya’ tracks that bypass customs posts. The export markets are in the main producing areas and are very close to the neighbouring importing countries. Tanzanian rice of good quality is preferred in these markets with a 15 per cent price premium over other imported rice but is irregularly available due to export bans and high export tariffs imposed by the Tanzania authorities.

Table 2 Estimates of Tanzania milled rice exports (tonnes) to neighbouring countries, 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Amount exported (tonnes)</th>
<th>Formal trade</th>
<th>Informal trade</th>
<th>Total exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tanzania data</td>
<td>Importing country data</td>
<td>Informal trade</td>
</tr>
<tr>
<td>Uganda</td>
<td>7 743</td>
<td>27 338</td>
<td>2 734</td>
<td>30 072</td>
</tr>
<tr>
<td>Rwanda</td>
<td>23 985</td>
<td>24 228</td>
<td>2 423</td>
<td>26 651</td>
</tr>
<tr>
<td>Kenya</td>
<td>2 622</td>
<td>10 475</td>
<td>1 048</td>
<td>11 523</td>
</tr>
<tr>
<td>Burundi</td>
<td>155</td>
<td>5 877</td>
<td>588</td>
<td>6 465</td>
</tr>
<tr>
<td>Democratic Republic of Congo</td>
<td>1 409</td>
<td>1 409</td>
<td>141</td>
<td>1 550</td>
</tr>
<tr>
<td>Total</td>
<td>35 914</td>
<td>69 327</td>
<td>6 933</td>
<td>76 260</td>
</tr>
</tbody>
</table>

Long term projections for the East African region are for a substantial and growing deficit in food. The discrepancy for rice is expected to rise from 1.15 million tonnes in 2009 to 2.84 million tonnes in 2020 with the rising trends forecast to continue until beyond 2025. A critical factor in exports, however, is the rate of growth of rice production in Tanzania. Production in the period 2001-2011 grew at 6.99 per cent but because of rapidly growing domestic demand Tanzania will find it difficult to achieve and sustain an export surplus. Were a 10 per cent rate of growth to be achieved there would be adequate surpluses for export but if it were to fall to 5 per cent increasing trade deficits could be expected.

3. THE RICE VALUE CHAIN

3.1 Overview

The value chain describes the range of activities required to move a commodity through the various stages that bring it from the first point of production to the last point of consumption. This usually involves a combination, often complex, of physical change, inputs from various producer services, transfer of ownership and delivery. Commodity value chains are increasingly recognized as providing a solid framework for the analysis of the public and private sector stakeholder players within them as well as the overall performance of particular markets.
The rice value chain from supply and use of inputs, via production and processing to marketing and retailing and on to the consumer is confounded by many technical and institutional impediments. The chain is fragmented, unorganized, disorganized, uncontrolled (in spite of being over-regulated) and uncoordinated. It is dominated by large numbers of small holder producers, an unknown but undoubtedly immense number of middlemen who operate across every link and a similarly unknown number of small processors and individual sellers who supply restaurants, cafes and street vendors or put products on the market for the consumer but who mainly lack the technical and financial ability to run it efficiently and profitably. The horizontal and vertical linkages of the value chain are generally weak and uncompetitive and in need of support to strengthen them.

In Tanzania the rice value chain includes multiple horizontal and vertical links from the producer to the consumer. Those involved in the chain include primary producers, traders in paddy and milled rice, processors, wholesalers, retailers and consumers. Most actors are not specialized and their functions relate to various segments of the value chain.

3.2 The Value Chain Map

A preliminary evaluation of the value chain shows that the whole is suspended from the consumer. Were a link to the rest of the chain to be broken the whole would be susceptible to collapse. This situation is more or less true for all other links in the chain. Each link takes the product from its immediate predecessor and “processes” it to an output that is used by the next link. Nominally, the value of product increases at each stage until it reaches the consumer. It is possible to provide a succinct list of most of the participants in the chain (Table 3) but pivotal roles are played by the middle links through which all products must pass. Many participants in the chain (Table 4) occupy more than one role. Some small scale producers but especially those of slightly larger scale also act as processors and retailers. Further up the chain some processors are also wholesalers and retailers and operate in both the domestic and export markets. Primary producers may sell rice directly through a market, to a trader or to a processor or may use a combination of all three outlets. A trader can sell to another trader, directly to a wholesale or retail merchant or to a processor or, again, may broaden his option by using a combination of these channels. Processors, especially the smaller enterprises, may buy rice directly from farmers or from traders and sell the products to wholesalers or retailers.

Every link in the chain relies on goods and services in order to fulfil its role(s) (Figure 9). At the various stages, goods and services include land, labour, machinery, seed supplies, fertilizers, pesticides, transport, energy and finance. Also required are clearly defined and enunciated standards and a regulatory framework under – and applied by – law. Many of these requirements continue to be weak or non-existent in Tanzania.

<table>
<thead>
<tr>
<th>Table 3 Simple listing of supply and service participants in the Rice Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core actors</strong></td>
</tr>
<tr>
<td>Producers (traditional primary producers (rainfed), improved smallholder production (inputs and limited irrigation), commercial producers (partly integrated enterprises, irrigation, few out growers))</td>
</tr>
<tr>
<td>Traders and agents</td>
</tr>
<tr>
<td>Wholesalers</td>
</tr>
<tr>
<td>Dry rice retailers (rural, urban, supermarkets)</td>
</tr>
<tr>
<td>Rice product retailers (street vendors, cafes, shops, supermarkets)</td>
</tr>
<tr>
<td>Importers</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table 4 Participants and functions in the Southern Highlands Rice Value Chain

<table>
<thead>
<tr>
<th>Participant</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Extension</td>
<td>There is considerable research on rice in Tanzania. The International Rice Research Institute has a major presence as do other centres of the Consultative Group on International Agricultural Research (CGIAR, see Annex 5). The Zonal Research Institutes and other stations of the Ministry of Agriculture, Food Security and Cooperatives (MAFC) carry out research on rice but are in need of reliable long-term core funding. Uyole Agricultural Research Institute Mbeya has responsibilities in training and extension. The Iringa Veterinary Investigation Centre is the reference laboratory for diseases in the Southern Highlands. Research, in principle, works hand in hand with extension.</td>
</tr>
<tr>
<td>Input suppliers</td>
<td>MAFC and the municipalities provide limited extension services. The Agricultural Research Institutes (ARI) and Agricultural Seed Agency (ASA) have developed many new varieties and IRRI have released two new types bred especially for Tanzania but demand for and uptake of these is very low. None of the 15 private seed companies in Tanzania distributes improved rice seeds. Government subsidizes fertilizers via a voucher scheme but this benefits large farmers more than smallholders. Financial services are limited and available only to a favoured few.</td>
</tr>
<tr>
<td>Producers</td>
<td>Most rice (74 per cent by area) is upland rice grown by smallholders, next in production magnitude (20 per cent) is the improved small scale rainfed production (with some limited irrigation) and finally (6 per cent) is the large scale production and trading companies which may be partially vertically integrated (and to a lesser extent horizontally through growers).</td>
</tr>
<tr>
<td>Traders</td>
<td>Primary buyers and secondary buyer-agents operate throughout the country. Much trading takes place at the point of production. There are some larger and a multitude of middle and small sized traders throughout the country. There is some trade by road from surplus to deficit areas but the main long distance trade is towards the Dar es Salaam market.</td>
</tr>
<tr>
<td>Processors</td>
<td>Initial processing – threshing out the paddy, drying and storing – takes place mainly at the point of production usually under intensive labour and often primitive conditions. Post harvest losses are extremely high with as much as 50 per cent of the original grain being lost for various reasons. Local traders and millers further along the chain add value through milling the paddy. Milling is the central hub of processing when the hull (husk) is removed from the grain to become “rice”. Most mills have a capacity of 5 to 20 tonnes of paddy per day and these probably account for in excess of 90 per cent of milling operations. The larger millers – up to 120 tonnes per day – generally operate for about five months in each year. Small mills generally produce inferior rice of “standard” quality (30-50 per cent broken) whereas larger mills produce “Grade One” rice with less than 15 per cent broken grains.</td>
</tr>
<tr>
<td>Retailers</td>
<td>Retailing of raw milled rice (‘mchele’) is usually done through local shops or ‘duka’ by recognized but often informal businesses. Street traders and cafes sell cooked rice ‘wali’ in various ways almost always accompanied by a vegetable or meat sauce. Better quality rice is available at most supermarkets and some specialized retail shops.</td>
</tr>
</tbody>
</table>

The three principal rice production systems are:

- **Traditional** – small scale rainfed production that uses seeds saved from the previous harvest with is minimal use of fertilizer, limited use of the Warehouse Receipts System (WRS) and producers are spot price takers on the local market. This is the major system, grown on about 74 per cent of the rice area in the country and is at the beginning of long chain that is fragmented both horizontally and vertically. Paddy is sold to local or regional traders who use small local mills for processing but some selling is directly to the mills which in turn sell to traders and rural households and there are other sales by regional traders via brokers or directly to urban wholesalers who sell to urban retailers. There is very limited value addition, particularly at the milling stage because most small mills have poor quality machines that result in a high percentage of broken grains. This is not a problem for the 30 per cent of rice that is consumed by the household but is for product that is to be sold on to the market. Small quantities from this system are exported to neighbouring countries.
Improved small scale rainfed production with some limited irrigation – this system accounts for 20 per cent of the rice area, some use is made of new cultivars, the crop is planted by hand in rows and some fertilizer is used which leads to better yields. Coordinated and bulk trading via WRS allows better management of price risk by controlling access to market and minimizing postharvest losses from poor storage. Paddy is normally custom milled in small mills near production areas. Farmers at times operate in groups when taking on additional value chain functions leading to incremental improvements in horizontal and vertical integration at the local level.

Large scale production – involves large scale commercial farms and trading companies (Box 2) who may source in part through out growers. The system contributes 6 per cent to the national rice area. Operators are involved in other chain functions including input and service provision, storage, milling and distribution to urban wholesalers. These last sell to various consumer groups, especially the medium to high income retail segment. This can represent a considerable amount of all rice traded and marketed. These enterprises either have their own or contract a medium to large mill to process the paddy. Large producers have leverage that could result in transformation of the value chain, particularly in terms of integration and improving chain efficiency, performance, governance and information flow.
The rice sector lacks integration. Transparency, enforcement of regulations, traceability and a conducive business environment are largely lacking. Production/processing, trading/distribution through wholesalers and marketing/retailing operate largely independently of each other and on a transaction basis with little information sharing.

There whole chain largely lacks governance. No one player controls or drives the development of the chain (although greatest influence is exerted by millers and wholesalers) which operates on a commodity basis and is transaction rather than consumer/customer based. The chain does not operate as an entity and each link looks to serving its own interests. Any interest in backward integration by larger established traders is impeded by a lack of investment data. Little value is added along the chain. Small producers are particularly disadvantaged because of their distance geographically and physically from the main consumer markets and lack of information on market prices.

Factors driving dynamics in the value chain include:

- government trade, market, transport and land tenure and irrigation policies;
- weather (climate) and its effects on production;
- consumer income and related preferences;
- investment decisions by large producers, traders and millers in production, storage and processing; and
- competition from other crops.

Uncertainty and risk permeate the value chain. These factors underlay many of the constraints to growth. The uncertainty varies for the various links in the value chain (Figure 10) and is caused by inconsistent or poorly implemented policy, a dearth of information, inadequate infrastructure and an inherent lack of trust and strong relationships among the players in the chain. These risks create inefficiencies in the system and discourage capital investment (via debt equity) that can be minimized and capitalized on only by a large fully integrated company.

Most rice is grown in Tanzania as a rainfed crop. Yields are therefore uncertain and variable national production causes dramatic fluctuations in price. Uncertain yields and price fluctuation discourage farmers from investing in improved seed, fertilizer or postharvest grading, sorting or quality improvements. As most smallholders consume most of their output the surplus varies even more than production itself (if 80 per cent is consumed a 10 per cent yield fluctuation leads to a 50 per cent surplus fluctuation). Use of processing plants also fluctuates as a consequence and results in limited investment in processing with many small mills instead of fewer more efficient large ones.
Market contracts are rare and even more rarely enforced. Informal agreements are the norm and for most transactions both parties to the deal are present and witness the goods change hands. All other transactions involve a significant risk of one party reneguing on the agreement. This uncertainty is coupled to variable bag weights and variable quality and inevitably means that trader margins are increased to minimize the impact of bad deals.

Inadequate storage capacity and distribution means that farmers and traders have little choice on the timing of sales. Without storage facilities farmers are forced to sell during or immediately after harvest when there is a glut on the market and prices are low. Were producers able to store their grain they would be able to sell some in the harvest period and store some until prices on the market rose. Better store would smooth the supply and demand (and thus the price) for paddy. Poor feeder roads result in very high transport costs.

Low value rainfed agriculture including rice production is considered a risky proposition for banks and investors. This restricts both availability of finance or credit (lenders) and uptake of credit (borrowers). A lack of understanding of how to evaluate and price this risk contributes to the stalemate on both sides of financial transactions.

3.2 Technology Generation

The technology in use at each link and throughout the chain as a whole is old and outmoded. The sole exception is the variety TXD 306 (commonly known as Saro 5, Saro = semiaromatic rice) high yielding cultivar which has been developed at the Ifakara Research Centre (formerly Kilombero Agricultural Research and Training Institute (KATRIN) and a Regional Rice Centre of Excellence) which has responsibility for rice technology improvement and transfer.
Commercial ventures such as Kilombero Plantations Limited (KPL) are a source of new technology generation in the Tanzania rice sector. KPL is involved in several stages of the chain but particularly with inputs (improved seeds, fertilizers), irrigation, production, harvesting, storage, milling and distribution to wholesalers. KPL aims to be the lowest cost rice producer in Tanzania and is prospecting best practice technology wherever rice is produced. They are thus influential in introducing new technology to the various levels of the chain in which they are involved. This applies to both KPL’s own large farm and their involvement in improving small holder farming.

The main examples of technology generation and dissemination used by KPL include:

- Evaluation of 170 new rice cultivars for productivity and quality in the Kilombero environment (obtained by Syngenta (a Swiss global chemical and seeds company) from IRRI in the Philippines and from elsewhere in the world);
- Introduction of the System for Rice Intensification (SRI) for smallholder farmers originally developed in Madagascar to improve yields and quality where it has achieved impressive results (KPL brought the originator of the system to Tanzania to plan its introduction and technology transfer to KPL’s smallholder scheme);
- Introduction of mini-combine harvesters from the Phan Tan company in Vietnam to be used by small out growers to improve the efficiency of harvesting and threshing, to maintain paddy quality and to reduce labour costs;
- Burning waste (hulls and bran) from milling to generate heat for drying harvested paddy before it is stored and milled (proper drying of paddy is a critical step in maintaining grain quality);
- Storage of dried paddy in large white plastic tunnels on the ground;
- Use of high quality medium volume rice milling machines from the Bui Vanngo company in Vietnam based on advice from postharvest specialists at IRRI;
- Centre pivot irrigation as it allows more efficient water use than traditional flood irrigation techniques and will also a dry season crop to be grown (thus two crops per year but from a very capital intensive technology; and
- Introduction of conservation farming/minimum tillage practices.

IRRI, with which KPL has developed close links, has an extensive portfolio of cutting edge technology projects that is being implemented on a global basis. One example is the C4 project involving the introduction of higher capacity photosynthesis systems to increase yields and there are many others related to production and postharvest handling (Table 5).

Table 5 Opportunities for technology advances for rice development in Tanzania

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Improved varieties</td>
<td></td>
</tr>
<tr>
<td>Hybrids</td>
<td>New generation stress tolerance</td>
</tr>
<tr>
<td>Stress tolerance</td>
<td>Varieties for conservation agriculture</td>
</tr>
<tr>
<td>Improved systems</td>
<td></td>
</tr>
<tr>
<td>Agronomy (site specific nutrient management, alternate wetting and drying)</td>
<td></td>
</tr>
<tr>
<td>Conservation agriculture</td>
<td></td>
</tr>
<tr>
<td>Mechanization</td>
<td></td>
</tr>
<tr>
<td>Improved value chains</td>
<td>Postharvest technology</td>
</tr>
</tbody>
</table>

Source: IRRI 2012
3.3 Input Supply and Demand

Improved seeds, fertilizers, chemical and finance are critical inputs. There is limited use of all these inputs across all cropping systems in Tanzania.

The ASDP Performance Report for 2009/2010 indicates that the number of crop farming households using improved seeds increased from 18 per cent in 2002/2003 to 24 per cent in 2007/2008. Use of chemical fertilizers increased marginally from 12 per cent to 13 per cent in the same period whilst use of insecticides and fungicides declined from 17 per cent to 14 per cent. Fertilizer use across all crops is minimal, varying from 5 kg/ha to 8 kg/ha whereas annual nutrient depletion is estimated at 61 kg/ha. Tanzania experiences some of the worst soil nutrient depletion in the region which makes the case for extensive fertilizer use all the more compelling.

A Baseline Study by KILIN of 722 randomly selected households across six rice producing districts (Mbarali, Kyela, Sengerema, Bunda, Kilombero and Mvomelo) provides a detailed understanding of current rice production. Some 70.1 per cent of the production area was lowland rice, 24.9 per cent was irrigated and 5.1 per cent was upland rice. Most producers were cultivating small plots of land ranging from 0.2 to 2.0 ha. The major findings of the study in relation to inputs were:

- improved production technologies have not been adopted by a wide range of farmers and most farmers are unaware of the technologies available;
- some 34.5 per cent of farmers used improved rice seed but only 19.0 per cent of the planted area was with improved rice varieties with 18.0 per cent of farmers using improved seed producing lowland rice, 14.5 per cent producing irrigated rice and 2.0 per cent producing upland rice;
- average yield was 2.8 t/ha in the range 2.1 to 3.4 t/ha with Mbeya (2.8 t/ha) and Morogoro (3.4 t/ha) having the higher yields;
- yields of 3.6 t/ha were achieved by farmers growing improved compared to 2.4 t/ha for those growing local varieties;
- yield was significantly higher with irrigated compared to lowland and upland rice;
- there was limited use of improved sowing or planting methods;
- more men than women used improved seed;
- improved seed was used by 13.2 per cent of farmers in Mvomelo, 12.2 per cent in Kilombero, 5.1 per cent in Mbarali, 2.8 per cent in Bunda and 1.2 per cent in Kyela;
- unavailability of seed was the main reason for not using improved varieties;
- some 40 per cent of farmers used saved seed of local varieties but even those using improved seed recycled seed for at least 3 years;
- where retained seed was not used 30.5 per cent of farmers obtained seed from neighbours, 28.8 per cent from local markets, 15.7 per cent from local stores and 10.2 per cent from extension workers;
- seed price averaged TSh 2258/kg which farmers considered too high (the high price is due to strict seed certification regulations which require compulsory certification but contribute to increased transaction costs);
- demand for improved seed is higher than production (in 2009/2010 only 1.5 tonnes of breeder seed was available to ASA from which it produced 55.6 tonnes basic seed which in turn was multiplied to produce 550 tonnes certified or commercial seed);
- the most preferred attributes in rice varieties were yield and taste (aroma) – in a separate study in Nzega and Igunga districts heavy yield, good aroma, marketability, heavy grain and disease and drought resistance were sought after traits;
- some 47.2 per cent of farmers said they applied fertilizers and 41.4 per cent used pesticides (note the contrast with ASDP findings);
- no farmers owned tractors but some hired them;
- loans were obtained by 16.5 per cent of households (41.5 per cent from microfinance institutions, 25.2 per cent from neighbours and 8.1 per cent from relatives;
some 24.4 per cent of loans were used for purchase of seed, 19.5 per cent for fertilizer and 17.1 per cent for pesticides;

input subsidy (vouchers) was obtained by 36.9 per cent of households of which 87 per cent was used to buy fertilizer; and

each farmer was visited by a village extension officer at least twice during the rice growing season and 51.1 per cent of farmers obtained information on improved seed from extension officers whereas 27.5 per cent got this information from other farmers.

The Rural Urban Development Initiative (RUDI) supports more than 15 000 smallholder farmers in Kilombero, Iringa Rural and Mbarali Districts. According to RUDI less than 10 per cent of these use new improved high yield cultivars. This, in part, at least, is because they have no access to them but also because these cultivars do not meet consumer needs especially in palatability and aroma. As paddy as a cash crop farmers prefer cultivars with strong market demanded. It has also been found that the introduction of improved rice varieties is best done as a package of technologies including other agronomic practices in order for the new cultivars to achieve their potential.

Among the determinants of technology adoption is the availability of credit. Credit has a positive effect on fertilizer use but little impact on the adoption of improved varieties. The National Microfinance Bank (NMB) and the Cooperative Rural Development Bank (CRDB) are the main and largest providers of credit to agriculture in general in Tanzania. They have branches in most districts of the Southern Highlands. NMB has a range of products including loans for farmer groups and also SME loans applicable to processors. Collateral requirements are strict. Interest rates are based on Treasury Bills plus 1 or 2 per cent and range from 19 per cent for Small and Medium Enterprises (SME) to 24 per cent for micro enterprises. Both banks provide funds to Savings and Credit Cooperative Societies (SACCOS) and Microfinance Institutions (MFI). Several other banks, including the Tanzania Postal Bank (TPB), National Bank of Commerce (NBC) and Exim Bank (Tanzania) (EBT) operate in the Southern Highlands (Table 6) and could be sources of credit for livestock in the future. Government is in the process of establishing an Agricultural Bank as proposed in the ‘kilimo kwanza’ initiative and has made a start with the Agriculture Window Unit in the Tanzania Investment Bank.

<table>
<thead>
<tr>
<th>Item</th>
<th>Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NMB</td>
</tr>
<tr>
<td>Range of loan amount</td>
<td>300-500 million per MFI/SACCOS</td>
</tr>
<tr>
<td>Types of products</td>
<td>Whole range of financial products to individual clients: these include savings, loans, money transfers, payment services etc. Wholesale loans are sometimes extended to SACCOSs and MFIs.</td>
</tr>
<tr>
<td>Profile of clients</td>
<td>NMB, NBC, EBT and CRDB are primarily indirect providers to rural areas through their links with MFIs and SACCOSs. TPB has a greater tendency to provide direct services to individual rural clients.</td>
</tr>
<tr>
<td>Portfolio characteristics</td>
<td>CRDB volume of loans to agriculture (rural) comprises about 25 per cent of total lending. NMB has extended significant lending in agriculture whereas TPB, NBC and EBT have continued to lend to individual farmers as demand arises.</td>
</tr>
<tr>
<td>Financing sources and capital structure</td>
<td>SACCOS and other MFIs are able to generate funds from the banks, NGOs and own members.</td>
</tr>
</tbody>
</table>

Source: Small Industries Development Organization (SIDO) 2009
Inadequate access to finance is a problem at every stage of the inputs chain. Access to finance is an important determinant of the ability of importers and dealers to undertake their business. Importers and wholesalers, rather than banks, extend trade credit to agrodealers but the latter do not normally offer credit to customers. Most farmers must therefore resort to the proceeds of crop sales to finance the purchase of inputs. Input purchase, however, competes with numerous other needs for cash, including payment of taxes, school fees and food and medicines.

Government’s main policy response since 2007 to overcome low use of inputs has been the National Agriculture Input Voucher Scheme (NAIVS), funded by the World Bank, for the purchase of fertilizers and seeds. The NAIVS is delivered through village councils, is being introduced in phases and aimed to reach 3 million farmers by 2011. Beneficiaries each receive a voucher worth about 50 per cent of the retail cost but must find the other half themselves. Vouchers can be redeemed at designated outlets managed by trained agrodealers who have received complimentary training. Fertilizers are packaged in 50 kg bags that retail at Tsh 11 000 for local to Tsh 50 000 for imported phosphate fertilizers but this is generally too expensive for smallholders. As a response fertilizer is also sold loose by retailers which increases the final cost because of spillage, caking and inaccurate scales. The value of the subsidy up to the end of 2011 was US$ 80 million but is acknowledged that a major challenge is getting the input to the farm gate.

Additional issues that affect the uptake of inputs and especially seeds and fertilizers are:

- fertilizer demand is subsidy-dependent which limits growth and investment opportunities for suppliers;
- improved seeds and fertilizers are seasonal and capital intensive products but a retailer’s limited inventories and capacity to borrow cannot meet the level of demand such that unavailability is an important constraint to uptake;
- dealers lack knowledge of input products and have little basic business knowledge which can be both the cause and the effect of low profitability and can lead to high failure rates;
- most agrinput retail stores are in major towns or along main highways with very few stores in rural areas because of poor infrastructure and high transaction costs; and
- poor transport -- much of the input supply and most of the outbound crop are transported by head load or by bicycle (Figure 11) – greatly increases distribution and marketing costs.

Internal problems of fertilizer supply are compounded by the shallow and overcrowded port of Dar es Salaam. The port is both inefficient and poorly equipped to handle fertilizers leading to excessive caking and the maximum 20 000 tonne vessel capacity results in high unit freight costs. Two Scandinavian fertilizer companies, Yara (which is a partner with SAGCOT and will build a fertilizer distribution centre in the southern highlands) and Dar es Salaam Corridor Group are developing fertilizer terminals at Dar es Salaam.

In summary several issues relate to the demand and supply of inputs and the systems that deliver them (Figure 12). Lack of farmer awareness of new cultivars has implications for the effectiveness and supply of public and private extension services and therefore of technology transfer. New technologies need to be promoted as an integrated package rather than piecemeal for individual actions. Farmers have concerns – in part at east, justifiable – that the attributes of new cultivars do not fully meet consumer needs and therefore affect marketability. There are availability, distribution and cost issues for both improved seed, fertilizer and crop health products that have an impact on input delivery to the farm gate. There are many challenges to agrodealers because seeds, fertilizer and chemicals are in demand only seasonally. Although rice inputs are unlikely to represent their main business there is risk from unsold stock.
Figure 11 Local transport of rice necessities

Figure 12 Schematic representation of Tanzania’s input sector as it relates to rice (SIPA 2010)
3.4 Production

3.4.1. Systems and small and large scale production

Rice is a highly versatile crop that can be cultivated under a range of different ecosystems. In Tanzania most rice is produced under lowland rainfed conditions, this being followed by the crop grown with the aid of irrigation and finally some rice is grown in an upland system (Figure 13). Many steps are involved in rice production from seed selection to postharvest handling (Annex 6).

Figure 13 Rice production systems in Tanzania: lowland rainfed, irrigated and upland

Rainfed lowland rice is typically drought prone, favours medium depth, is subject to water logging and submergence under floods and produces erratic yields. It is estimated that Tanzania grows 65 million ha of rainfed lowland rice or about 74 per cent of the total rice area (Figure 14). The main production areas are around Lake Victoria and in Tabora, Shinyanga, Dodoma and Kigoma Regions. Only one crop per year is possible and fields are flooded to a depth of as much as 50 cm during part of the season. Production is variable mainly because of the lack of technology but major challenges include water control (either drought or flood), weed management and low soil fertility. On the other hand soils in the lowland ecosystems are generally less fragile and floodwater conditions promote the growth of nitrogen fixing bacteria and blue-green algae that also produce nitrogen to sustain crop growth. Attainable yields with full control of water are 3-6 t/ha but actual yields in Tanzania are lower and are typically 1-3 t/ha. Paddy quality is low due to poor water management and, often, delayed harvesting as farmers wait for fields to dry out but the harvested paddy is then drier than optimal.

Irrigated lowland rice is not directly dependent on rain and can usually be grown throughout the year. Mbeya Region, Kilombero District and Mtibwa are the main irrigated rice production areas. Irrigation of rice is practised on 5 million ha, equivalent 6 per cent of the national rice area. Full water control allows two crops per year to be grown. Irrigated rice is grown in bunded (embanked) paddy fields in which water depth can be maintained at 5-20 cm. Average yields of paddy on farmers’ fields are 3-6 t/ha per cycle. Paddy quality is generally good and the supply of water can be controlled.

Upland rice is grown under dryland conditions in mixed farming without irrigation. It is grown on 17 million ha or 20 per cent of Tanzania’s total rice area. Most upland rice is grown in the Usambaras, Udungwas and Mahenge. The crop is affected by drought, low soil fertility and soil acidity and yield is reduced by a host of biotic stresses such as diseases, insect pests, weeds and birds. Yields are very low and usually less than 1 t/ha of poor quality paddy.

A critical issue facing rice production is low productivity. Total production increased considerably in the period 2000-2010 but this was achieved from an increased area and not increased output per unit area (Table 7). Output of paddy at 1.5 t/ha is low even by African standards (2.5 t/ha) and very low by Asian standards (4.4 t/ha). Unit area yields in Tanzania declined by 2.0 per cent per year in the period 2000-2010 whilst they rose by 0.9 per cent for Africa as a whole and 1.2 per cent for Asia.
Figure 14 Area and yields of rice in three production systems in Tanzania (BMGF 2012b)

Table 7 Area, yield and production of paddy in selected countries and regions

<table>
<thead>
<tr>
<th>Country</th>
<th>Area '000ha 2010</th>
<th>annual growth (%) 2000-2010</th>
<th>Yield t/ha 2010</th>
<th>annual growth (%) 2000-2010</th>
<th>Production '000 tonnes 2009</th>
<th>'000 tonnes 2010</th>
<th>annual growth (%) 1990-1999</th>
<th>annual growth (%) 2000-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>720</td>
<td>5.6</td>
<td>1.5</td>
<td>-2.0</td>
<td>1334</td>
<td>1105</td>
<td>-0.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1350</td>
<td>1.1</td>
<td>3.5</td>
<td>5.5</td>
<td>4540</td>
<td>4738</td>
<td>0.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Ghana</td>
<td>181</td>
<td>4.6</td>
<td>2.7</td>
<td>2.3</td>
<td>391</td>
<td>492</td>
<td>11.7</td>
<td>7.1</td>
</tr>
<tr>
<td>Senegal</td>
<td>147</td>
<td>5.5</td>
<td>4.1</td>
<td>5.8</td>
<td>502</td>
<td>604</td>
<td>11.7</td>
<td>11.6</td>
</tr>
<tr>
<td>Egypt</td>
<td>460</td>
<td>-3.5</td>
<td>9.4</td>
<td>0.3</td>
<td>5520</td>
<td>4330</td>
<td>7.0</td>
<td>-3.2</td>
</tr>
<tr>
<td>DRC</td>
<td>420</td>
<td>-0.6</td>
<td>0.8</td>
<td>0.0</td>
<td>317</td>
<td>317</td>
<td>-1.3</td>
<td>-0.6</td>
</tr>
<tr>
<td>Mali</td>
<td>686</td>
<td>6.9</td>
<td>3.4</td>
<td>4.8</td>
<td>1951</td>
<td>2308</td>
<td>11.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1788</td>
<td>-2.0</td>
<td>1.8</td>
<td>1.8</td>
<td>3403</td>
<td>3219</td>
<td>3.1</td>
<td>-0.2</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>545</td>
<td>11.5</td>
<td>1.7</td>
<td>4.4</td>
<td>785</td>
<td>909</td>
<td>-7.6</td>
<td>16.4</td>
</tr>
<tr>
<td>Mozambique</td>
<td>185</td>
<td>0.0</td>
<td>1.0</td>
<td>-0.1</td>
<td>179</td>
<td>180</td>
<td>7.6</td>
<td>0.0</td>
</tr>
<tr>
<td>AFRICA</td>
<td>9050</td>
<td>2.5</td>
<td>2.5</td>
<td>0.9</td>
<td>23278</td>
<td>22852</td>
<td>3.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Thailand</td>
<td>10990</td>
<td>1.1</td>
<td>2.9</td>
<td>1.0</td>
<td>32116</td>
<td>31597</td>
<td>3.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Vietnam</td>
<td>7514</td>
<td>-0.2</td>
<td>5.3</td>
<td>2.3</td>
<td>39050</td>
<td>39989</td>
<td>5.6</td>
<td>2.1</td>
</tr>
<tr>
<td>ASIA</td>
<td>134923</td>
<td>-0.1</td>
<td>4.4</td>
<td>1.2</td>
<td>684780</td>
<td>672021</td>
<td>1.8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: FAO 2012
Output per unit area in Tanzania varies, however, by region and by year. Manyara Region has generally had the higher yield with Dodoma Region the lowest (Figure 15). As almost all Tanzania rice production is rainfed the weather has a dramatic and fluctuating effect on output from one year to the next. Rainfall in 2007/2008, for example, was generally higher across the nation than in 2002/2003.

Figure 15 Annual yield of paddy in Tanzania regions in 2002/2003 and 2007/2008 (ASDP 2011)

Higher rice productivity (Box 3) could be achieved by applying a technology package that includes:

- high yielding cultivars;
- appropriate application of fertilizers that are matched to both crop and soil nutrient status;
- irrigation coupled with good water management not only increases yield but also enables two crops to be grown in any 12 month period (a rainfed crop in the wet season and an irrigated crop in the dry season);
- transplanting into regular rows (thus making weed control easier) rather than broadcasting of seeds;
- weed, pest and disease control; and
- effective cultural practices and harvest and postharvest management that includes mechanized harvesting and threshing to maintain grain quality and to reduce postharvest losses prior to milling.

Farmers who participated in the Baseline Study, to which reference has already been made, had an average production of 5.39 tonnes of rice per household of which 3.50 tonnes on average was sold. Household consumption of 1.6 tonnes represents 30 per cent of production. Some 65 per cent of production was sold after accounting for rice saved rice for seed. The average total household income was TSh 1 382 821 with m contributing a greater proportion than women. At 36-39 per cent of the total, rice was the most important source of income followed by off-farm income which contributed 25-34 per cent. The main constraints to increased production were considered to be unreliable rainfall (57.8 per cent), lack of capital (37.5 per cent) and the high cost of inputs (31.2 per cent).

Small holder rice production whether “traditional subsistence” or “improved” needs to be viewed as a continuum and not as two distinct and separate systems. Smallholders have limited access to and participation in market focussed value chains. Their main sales outlet is small traders who purchase paddy at the farm gate at what is usually a less than fair prices. Poor road access and distance from the main urban markets are other barriers to smallholders to a more market focussed approach and hinder progress to larger more commercially focussed enterprises with stronger links to the markets. This would help the adoption of technology that would lead to increased productivity.
Traditional rice production is labour intensive and the almost total lack of any mechanical operation is a further hindrance to higher productivity. Low use of mechanization in Africa in general means that the number of man days required to produce rice is higher in Africa than elsewhere although where there is some use of mechanization as in Senegal the use of manual labour can be reduced (Figure 16). Low levels of mechanization result in poor land preparation, delayed planting and other cultural operations, late harvesting, serious loss of quantity and quality in postharvest operations and interference with the needs of other crops. In one Tanzanian example the introduction by KPL of 2.5 m wide combine harvesters for use by smallholders reduces harvest time from 3 days to 3 hours for 0.47 ha of paddy.

Figure 16 Labour requirement (mandays) to produce 1 ha of rice in Asia and Africa (BMGF 2012)

**Box 3: How Caroline increased her rice yield**

Caroline, whose husband is a fisherman, is a 52 year old woman with four children. She grows 1.6 ha of rainfed rice on land cropped every year and that she owns. In the past she grew traditional varieties and produced 20 bags (100 kg) per year of which 50 per cent was for seed under the Quality Declared Seeds of ASA and 50 per cent was for family consumption and market sale. In 2012 she changed to the improved variety TXD 306 (the popular SARO 5) and she produced 30 bags representing a 50 per cent increase in output.

Her success was due to:

- use of an improved variety -- Cultivar TXD 306 (Saro 5);
- hand planting of seedlings in rows for easy weeding;
- use of fertilizer (diammonium phosphate and urea) and a post-emergence herbicide;
- mechanical cultivation prior to planting of seedlings; and
- use of contract labour for weeding and harvesting.

Inputs are brought from the agrostore 1 km away and brought by bicycle. Harvested paddy is transported the same way from field to house (where it is stored) and on to the market but marketing is the biggest challenge.
Several farmer and industry organizations are involved, usually with support from Non-Governmental Organizations (NGO), in helping small landholders to improve their production and their commercial position (Box 4). The services provided include capacity and capability development and representation at policy forums as well as commercial functions including marketing and trading. They mainly operate with smallholders on a group basis.

**Box 4: Organizations assisting small farmers to increase production and commercial position**

AKIRIGO (Association of Kilombero High Quality Rice Growers) represents 42 farmer groups with a total of 12,000 members and also operates eight warehouses and four milling machines.

TAP (Tanzania Agricultural Partnership) based in Ifakara deals with 6200 smallholder farmers in groups.

RUDI (Rural Urban Development Initiative) covers 15,000 smallholder paddy farmers in Kilombero, Iringa Rural and Mbarali Districts, is involved with association development, collective sale through warehouse receipts, market/credit/input linkages, organization of public-private dialogue (PPD) at the district level and capacity building.

The large scale farmers have adopted or will adopt various strategies and tactics in order increase both area and total production.

Kilombero Plantations Limited (KPL) is the largest commercial producer of rice in Tanzania. Its production and processing operations are mainly directed to distributing milled rice to wholesalers in Dar es Salaam. KPL commenced operation in 2008 and at the end of 2012 4700 ha under cultivation giving average yields of 3.5-4.0 t/ha under rainfed conditions. The company works with 1500 out growers (for which the United States Agency for International Development (USAID) has provided some financial supporter) which will be increased to 5000 by 2016: inputs, training, finance, storage and milling are part of the outgrower package. A centre pivot system on 215 ha allows an irrigated crop yielding 6 t/ha to be produced in the dry season. Serious consideration is being given to an investment of US$ 25 million that would expand the area under centre pivots 3000 ha to enable two crops per year. KPL conducts its own seed research to improve yields and quality and uses bespoke fertilizers from Yara International: it has ambitions to become the lowest cost producer in Tanzania.

Kapunga Rice Farm is the largest rice farm in Mbeya Region (and the second largest in the country) and has plans to launch an outgrower scheme. It has received strong financial backing from its parent company (The Export Trading Group) which has invested large amounts of capital into the refurbishment and operation of the farm. Kapunga already grows rice on 3000 ha of which 1200 ha is farmed by smallholder tenant farmers. It achieves average yields of 3.5 t/ha from its own commercial production and 6 t/ha from its tenant farmers. The farm carries out its own seed research to improve yields and quality and uses fertilizers specific to individual situations. A modern processing facility produces a quality end product. Under these circumstances Kapunga aims to challenge KPL to become the lowest cost producer in Tanzania with a rice brand for both the domestic and export markets.

The second largest operation growing paddy in Mbeya Region (third largest in the country) is Mbarali Rice Farm which is also a production and processing company. Mtenda Kyela Rice Supply does not produce rice but is a trading company that works with contract farmers and provides training and inputs to over 10,000 small holders. It distributes milled rice (from the Wela mill) to wholesalers in Dar es Salaam.
3.4.2. Profits from production

Two examples of the financial implications of smallholder rice production can be presented. The one is from Kilombero district where KPL operates a smallholder outgrower scheme. The other is from Mbeya and is associated with the Mtenda production facility and based on information provided by a large trader. Both examples demonstrate the profitability of adopting improved technology packages.

Small holders associated with Kilombero Plantations Limited, Mngeta
Smallholders growing rice under traditional rainfed conditions are estimated to have a gross margin of US$ 33 per holding of 1 ha whereas those adopting KPL’s SRI improved technology package will have a gross margin of US$ 394 per 1 ha holding (Table 8).

Table 8 Financial analysis of smallholder rice production at Kilombero without and with adoption of KPL’s SRI package

<table>
<thead>
<tr>
<th>Item</th>
<th>Traditional</th>
<th>KPL’s SRI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area planted (ha)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Crops per year (no)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Paddy yield (t/ha)</td>
<td>2.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Paddy market price (US$/t)</td>
<td>226.0</td>
<td>226.0</td>
</tr>
<tr>
<td><strong>Costs (US$ per activity)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed/a</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Plough</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Harrow</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Plant/b</td>
<td>48</td>
<td>190</td>
</tr>
<tr>
<td>Weed 3 times</td>
<td>239</td>
<td>143</td>
</tr>
<tr>
<td>Post emergence herbicide</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0</td>
<td>267</td>
</tr>
<tr>
<td>Harvest and thresh</td>
<td>101</td>
<td>202</td>
</tr>
<tr>
<td>Storage</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td><strong>Financial data (US$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total variable costs</td>
<td>532</td>
<td>961</td>
</tr>
<tr>
<td>Total value of paddy</td>
<td>565</td>
<td>1335</td>
</tr>
<tr>
<td>Gross margin</td>
<td>33</td>
<td>394</td>
</tr>
</tbody>
</table>

Notes:  
- a - Mbeya Supa @ 60 kg/ha for traditional, Saro 5 @ 20 kg/ha for SRI  
- b - Broadcast for traditional, on grid (48 man days) for SRI  
Source: adapted from BMGF 2012b

Small holders associated with Mtenda Kyela Rice, Mbeya
Traditional rainfed small holders are estimated to have a gross margin of US$ 207 per holding of 1 ha whereas those who adopt Mtenda’s improved technology package (including improved seeds, fertilizer and other aspects) will have a gross margin of US$ 643 per holding of 1 ha (Table 9).
Table 9: Financial analysis of smallholder rice production in Mbeya at Mtenda Kyela rice scheme without and with adoption of improved technology package

<table>
<thead>
<tr>
<th>Item</th>
<th>Physical data</th>
<th>Costs (US$$ per activity)</th>
<th>Financial data (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area planted (ha)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Crops per year (no)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Paddy yield (t/ha)</td>
<td>2.7</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>Paddy market price (US$/t)</td>
<td>226.0</td>
<td>226.0</td>
</tr>
</tbody>
</table>

Notes: 
- a - Mbeya Supa for traditional, Saro 5 for improved technology
- b - Broadcast for traditional, on grid for improved technology

Source: adapted from BMGF 2012b

In general smallholder farmers producing paddy under rainfed conditions have negative to modest returns of 27 per cent. Thus many smallholders are hardly profitable in a commercial sense and are merely at subsistence level. Irrigated farms are more productive and profitable with simplified gross margins from 2 per cent to 61 per cent. Producers’ main cost drivers are own labour (60-80 per cent), inputs (10-30 per cent) and local transport costs (5-10 per cent). Traders, millers and retailers have positive gross margins varying from 9-25 per cent with the main cost drivers being paddy (60-80 per cent), transport (6-12 per cent), milling (5-10 per cent), loading/unloading (2-3 per cent), taxes (2-3 per cent) and, for bigger traders, storage (20-30 per cent).

3.5 Processing

3.5.1 Overview

Processing, for practical purposes, can be considered to start from the moment the paddy is harvested at its point of production, either sold by the owner to an agent or stored by him/her personally on the journey to market. From this point there is a multiplicity of variations in the pathways paddy follows before it ends up as human food, for livestock feed and as byproducts (Figure 17).
3.5.2 Marketing

In the 1960s and 1970s grain was extensively marketed and processed through NAFCO and the National Milling Corporation (NMC). With the operational and financial failure of these entities, however, the market was “liberalized”. Liberalization included effective privatization of physical infrastructure, irrigation schemes, farms, mills and storage facilities. Markets are still controlled to some extent by a plethora of rules and regulations. The main areas of regulation are for exports (by the Strategic Grain Reserve) and imports (tariffs). At the district level bylaws can be invoked against food sales out of the district in times of shortage. The WRS also acts in part as a regulator through its storage and payment systems. Important regulatory authorities are the Tanzania Bureau of Standards (TBS), Tanzania Food and Drugs Authority (TFDA), Tanzania Business Registrations Licensing Agency (BRELA), Occupational Safety and Health Authority and Local Government Authorities. The Ministry of Industry, Trade and Marketing (MITM) issues operating licenses to rice processing industries and trade licenses to rice traders. Licensing for food branding from TFDA and TBS takes a very long time and costs about TSh.400 000 per license. Other issues that create difficulties for the efficient functioning of the rice subsector are Government policies declaring rice as a staple food crop rather than a cash crop hence limiting its commercialization and the trade officers in districts being responsible to MITM whereas production is under MAFC and the absence of consistent policies matching the two closely related aspects.

There are many formal – and not a few informal – markets where it is possible or mandatory for producers to take or to send their product and sell it either by individual or group bargaining or by standard auction procedures. There is an extremely active and sometimes keen trade in rice. Trading, in the sense of a professional middleman buying and selling products at some point along the chain, is an important and, in the Tanzanian context, indispensable link in getting food or potential food from the producer to the consumer. Such traders are often accused of making excessive margins at the expense of other links but there is little evidence to support this contention (the margins are at wholesale and retail levels). Traders undoubtedly make speculative purchases from farmers but in the majority of cases they are buying to order, or on the presumption of an order and of an early resale. The risks born by traders are thus much less than those likely to occur at other points in the chain due essentially to the short time that the product is in his or her possession. As rice is a major food and traded crop with a very broad market demand the number of links between producer and processor can be long and convoluted and in turn can lead to a confusing range of grades and prices (Annex 7).
The marketing process for large farms is somewhat different as they prefer to sell their products direct to an end user, usually as milled rice rather than as paddy. These direct sales are not without hazard, however, and difficulty in selling the crop at what is seen as a fair price by the producers is not uncommon.

3.5.3 Threshing

The harvested whole crop paddy has to be threshed to remove the grain from the straw. In smallholder systems the process is almost invariably a manual operation although oxen may occasionally be used to trample out the grain. Hand operated or motor driven small threshers are available but are very rarely used. Large scale operations usually employ some form of mechanical power for threshing or a combine harvester may be used to harvest and thresh in a single operation.

3.5.4 Drying

Drying is the most critical operation after harvesting and threshing the paddy. Delays in drying, incomplete drying or ineffective drying reduce the quality of the grain and result in various magnitudes of loss. Drying aims to reduce the grain moisture content to the 18-22 per cent that is the safe level for storage. Smallholders usually dry the grain on mats using the power of the sun either in the field or on a convenient road that provides a ready made flat surface (Figure 18). Drying on mats leaves the paddy exposed to contamination from foreign matter such as stones, soil and faeces from straying animals. Drying is undertaken by the local miller if the paddy is destined for milling within the next week or so. Large scale operators may use forced cold air drying or air heated by the hulls or bran that are byproducts of the milling process (Figure 18).

Figure 18 Traditional sun drying and hot air drying using rice bran as the heat source (Photos: Ian Lewis)

3.5.5 Storing

Paddy is stored, it is to be hoped, to keep it in good condition until it is milled for sale or for household use. Proper storage reduces losses to weather, moisture, rodents, birds, insects, micro-organisms and theft. Storing paddy also enables producers to take advantage of higher prices later in the season or to serve future financial needs. Most smallholders store paddy in their own house or building attached or very near to it in less than optimal conditions. An improvement on storing at home and where there is a nearby facility paddy can be stored under the WRS which is managed through the Warehouse Licensing Board. The advantages of this system are that producers can store paddy until they decide to sell whilst at the same time using it as collateral with financial institutions for short term loans in advance of sale. Organizations such as RUDI have been involved in establishing and developing the WRS system and some NGOs are assisting in the rehabilitation of older warehouses to meet the required standards (Figure 19). Unfortunately the WRS remains the exception rather than the rule.
There is a critical lack of storage capacity in most of rural Tanzania. There is a greater need for storage in rural areas than in urban ones because it is economically rational to transport milled rice rather than paddy to urban areas. The limitation on rural storage capacity extends not only to farmers but also to small traders and to private sector warehouses. Initiatives to redress the problem have focussed on development of farmer storage. It is not essential, however, that rural storage be done by farmers or that farmers should own the storage facilities. The same advantages of professional storage, inventory credit and delayed sales could be derived from a professionally managed storage system subject to the condition that there were enough such systems to ensure proper competition. Such a system could be owned by farmers, by independent warehouse operators, by traders or by a combination of all three groups. The larger operators have their own storage facilities, either permanent or temporary (Figure 19).

Figure 19 A renovated smallholder warehouse at Ifakara and large scale storage under plastic tunnels at KPL Mngeta (smallholder renovation funded by the European Union: Elia Shemtor is an Extension Officer with TAP) (Photos: Ian Lewis)

3.5.6 Milling

Milling is the crucial step in the postharvest process. Paddy is milled to remove the hull and the bran layers. Both these constituents of the grain are usually removed together in Tanzania. If the hull only is removed the resultant product is brown rice. Removing the bran as well as the hull results in white rice which may then be polished to produce an edible white kernel ready for cooking or further processing. In larger mills rice is usually graded into various qualities – Grade One Supa being the top grade in Tanzania – although in smaller mills grading is unusual. The ratio of rice to paddy after milling is usually about 65 per cent but this varies up to 5 per cent above or below this figure.

Rice quality is determined by a range of factors. These include the variety (in Tanzania aromatic rice is preferred) but the milling process is the main determinant of quality (grade) in terms of appearance and proportion of broken rice. Small mills (Figure 20) generally use old machinery that produce a large proportion of broken rice, known as ‘chenga’ in Kiswahili. Large modern mills (Figure 20) are able to produce graded and polished rice. As the milling industry is dominated by small mills, most traded rice is ungraded and quite often comprises different origins and varieties. Where grading is carried out after and separate from the milling operation costs are in the region of TSh 17 000 per tonne of which TSh 10 000 is for the grading machine owner and TSh 7000 is the labour charge.

Mills in Tanzania are mostly of Chinese origin (although Vietnamese machines are being introduced). They generally electric-powered but some are driven by diesel engines. Roller mills in the Ifakara-Morogoro area generally have an output of 0.8-1.3 t/hour and produce about 10-12 t/day. Mills of this capacity cost TSh 5.8-6.2 million (US$ 3600-3800) ex Dar es Salaam. High prices of mills and graders severely affect the performance of the small and medium scale millers that dominate this link of the value chain. A further critical factor for the viability of milling is paddy availability which is most economic if there is a continuous and steady year-round supply but this is rarely the case.
Most milling is carried out as a service function. Producers or local brokers bring paddy to the mill and the mill charges for the decorticating process. Charges for milling are in the range TSh 60/kg to TSh 70/kg based on the output – that is the rice at the end of the process and not the paddy at the beginning. As many of the small traders are women they employ labourers to move their product in and out of the mill at a cost in the region of TSh 1600 per bag (TSh 16/kg) which includes, in the case of removing rice from the mill, sewing up the bag at the end of the milling operation. Loading and unloading charges outside Dar es Salaam on to and off lorries are TSh 800-1000 per 100-kg sack.

3.5.7 Adding value

There are few operations to add value to rice subsequent to milling. Mills capable of producing graded rice are usually limited to three or four grades plus ‘chenga’. Urban retailers may present, however, a bewildering array of grades based on minute differences in physical appearance (not apparent to the untutored or even tutored eye), aroma and origin. Some wholesalers specialize in producing retail packs whose mass varies from 1 kg to 25 kg. This is a basic form of branding but variation in supply, source, accuracy of grading at the mill and variety mean that there is no guarantee that a “brand” of August 2012 will be the “brand” as September 2012. There is very little local production of more sophisticated products such as rice flour, rice starch or rice cakes or bread.

3.6 Wholesale and retail distribution

Local farmers or traders move paddy from the point of production to a mill. Regional traders gather here to buy milled rice off the decorticator. Deals may be struck by these traders before milling who will then assume the costs of the operation. If no regional traders are present local operators store paddy or rice at the mill until a regional trader appears to conclude a transaction. Storage charges are usually of the order of TSh 1000 per sack of 100 kg, this not being time bound as deals are usually struck within a few days. Some regional trade moves rice from the production area to deficit areas such as Arusha and Moshi. Most movements from the Southern Highlands are to Dar es Salaam. Transport costs average US$ 0.40 per tonne kilometre from farm gate to rural primary market and US$ 0.27/t/km from secondary to wholesale market (Figure 21) but during peak times and from more remote rural areas costs may be higher. Moving rice from farmers to the final consumer involves, however, multiple transactions. The margins required by each party within multiactor chains substantially increase the final retail price. Long traditional chains, labour intensive production practices and high transport costs diminish Tanzania’s competitiveness and encourage imports. The end result is that local rice is often more expensive than imported rice (Figure 22).
The four large private rice producers are the biggest individual suppliers of rice to wholesalers in Dar es Salaam but are still small in terms of Tanzania’s overall production. As large suppliers, however, they influence others in the value chain. Each company has indicated that future plans include improved marketing with more branding to wholesalers and retail consumers including various pack sizes. In this, however, they have been pre-empted some of the large traders with a tentative approach to “place-of-origin” or “geographic” branding (Figure 23, see also Section 2.1, National Markets).

An estimated 15 major rice wholesalers or brokers operate in Tandika, Tandale and Buguruni which are the three main markets in Dar es Salaam. Tandika is probably the biggest market and is where the larger wholesalers are based. It has adequate space for trucks from Chimala (Mbeya) and Ifakara to offload. Wholesalers supply traditional retail and institutional (schools, military) (Box 5).

Consumers mainly purchase rice from 100-kg bulk sacks from traditional retailers. Each customer generally buys small quantities of loose rice on an almost daily basis from retailers operating in street or farmers’ markets who weight out small quantities as required. More affluent consumers with large families may buy prepacked quantities of up to 25 kg.
Competition among retailers is intense especially as consumers can buy rice at market stalls that have minimal capital costs and low operational requirements. The large number of retailers and the cost sensitivities of consumers result in tight margins and slim profits. There is some opportunity for profit in the use of volumetric measures that are not immediately verifiable but the return to retailing seemingly rarely exceeds 5 per cent and appears closer to 2 per cent of the value of rice sold.

Supermarkets are still only a small part of food retailing in Tanzania. In Dar es Salaam perhaps a 10-15 per cent share of retailing is through supermarkets. Arusha and other larger urban areas are seeing an increase in supermarkets and especially locally owned “minimarkets”. As in other retail outlets supermarkets sell imported rice, often for a small market segment, as well as the local product.
3.7 Target Group Considerations

A survey by the KATRIN Regional Rice Centre of Excellence of 722 farming households in six districts (Bunda, Sengerema, Mbarali, Kyela, Mvomelo and Kilombero) in April 2011 found that:

- households were producing mainly for subsistence with rice being the main determinant of household food security;
- there was some degree of food insecurity in the four years prior to 2011 (33.6 per cent of households reported a surplus, 33.9 per cent had enough to meet household needs, 23.8 per cent had a small deficit and 8.7 per cent had a large deficit);
- males were head of 87 per cent of the households with the remaining 13 per cent having females as household heads; and
- total average household income, mainly crop and livestock sales, was TSh 1 382 821 with men having a higher income (TSh 1 545 824) than women (TSh 1 040 724).

Hence it is difficult to determine if gender is an issue that requires a specific focus. The key is to be inclusive and involve both males and females in future programmes and activities (at a village meeting in Mngeta in August 2012, 40 per cent of the 60 people attending were women).

Youths in rural areas are an important consideration. They do not see agriculture – equating it to “a hoe” -- as being remunerative and believe it is about the past and not the future. Rural youths thus drift to the city where they perceive there is more opportunity. If agriculture were more remunerative and had more of a value chain approach it could become attractive to the younger generation.

4. SYSTEMIC CONSTRAINTS AND UPGRADING OPPORTUNITIES

4.1 Related to Business Enabling Environment

4.1.1 Doing business

The ability to carry out business in an efficient and profitable manner is important not only for commercial operations within Tanzania but also for attracting adequate amounts of new Foreign Direct Investment (FDI). According to the World Bank, Tanzania ranks 127 out of 183 countries in doing business: the regional average is 137. The World Economic Forum Competitiveness Report 2011-2012 finds Tanzania one of 37 factor-driven economies and ranks it 120 (down from 113 the previous year) out of 142. The situation is somewhat anomalous as it seems that Tanzania’s performance remains quite stable and the change in rank is mainly the result of other countries improving more quickly. The major reasons for this lowly position, in order of priority, are access to finance, corruption, tax rates, poor infrastructure, inflation and inefficient government bureaucracy (Figure 24).

Infrastructure is especially underdeveloped with limited poor quality roads and ports, an unreliable electricity supply and few fixed telephone lines (although mobile communications have rocketed to overcome this problem). Primary education enrollment is commendably high with nominally universal access but enrollment rates at secondary and tertiary levels are among the lowest in the world. The quality of the educational system is in dire need of improvement. A related area of concern is the low level of adoption of new and appropriate technology. This bodes ill for external and internal investment in new or the expansion of existing businesses. Under existing and likely future conditions it remains to be seen if the necessary investments will be made to take the rice value chain to the next level.
Tanzania is widely regarded as a country with a heavy regulatory burden that is only lightly implemented. Multiple – and often conflicting – legal instruments under the jurisdiction of multiple ministries and other official bodies impinge upon the agricultural sector (Box 6). Under ASDP, for example the target for regulations in place in 2009/2010 was four (up from one in 2005/2006) with that target being achieved. The 2010/2011 target for legislation was 13 but the actual number was 20 (up from nine in 2005/2006). Six new acts on agricultural marketing were approved in 2004/2005 and a further six pieces of legislation were enacted in 2009. Among the new rules and regulations are:

- The Food, Drugs and Cosmetics Act No 1 of 2003 (establishees the Tanzania Food and Drugs Authority (TFDA);
- The Tanzania Bureau of Standards Code No TZS 109:1987;
- Fertilizer and Animal Foodstuffs Act (1972);
- Seeds Act No 18 (2003);
- Cooperative Societies Act No 20 (2003);
- Food Security Act (1991);
- Warehouse Receipts Regulation and Warehouse Act No 37 (2007);
- Executive Agency (National Food Reserve Agency) (Establishment) Order (2008);
- The Standards Act No 2 (2009);
- The Cereal and Other Produce Act (2009);
- Fertilizer Bill (2009);
- Food Labelling Regulations;
- Food Import and Export Regulations;
- Standard TZS 538:1999- Packaging and labelling of foods;

Other laws and regulations pertaining to specific contract types, such as crop related legislation, banking law, microfinance, warehouse receipts and secured transactions.
Since 2009 foundation seed imports have been liberalized, seed monopolies have been removed. At least 16 private companies are now operating and breeder seeds are soon be made available to them. The five national seed farms no longer monopolize foundation seed production and registered seed producers are allowed to produce quality-declared seed that conforms to minimal standards for the crop. Breeders’ seed is approved by the National Variety Release Committee. The import process for seeds remains, however, bureaucratic, involving at least 10 steps and five regulatory agencies and takes at least six months to complete. Once imported, varieties are subject to continued scrutiny by the Tropical Pesticides Research Institute (TPRI) and Tanzania Official Seed Certification Institute (TOSCI). Seed certifications outside the East African Community (EAC) are usually not recognized. TPRI regulations conflict with the Seeds Act Law and to be sure of compliance and to minimize harassment investors in the seed sector need to get phytocertificates from both the Plant Health Service (PHS) and TPRI. The sanitary and phytosanitary (SPS) regime is thus most disadvantageous for producers who encounter several problems in gaining access to high yield varieties. Agricultural trade does not realize its potential and Tanzania’s crops (not only rice) are among the lowest yields of any country in the region. Effects may be particularly pernicious for women and their children who might otherwise be more food secure if they had access to higher yielding varieties.

4.1.3 Land rights and land markets

Land tenure in Tanzania is in the form of a right of occupancy and leasehold. All land belongs to the nation and there is no freehold system. The primary legislation governing land ownership is the Land Act No 4 of 1999 as well as the Village Act No 5 of 1999. Under the Land Act, there are several categories of land but the most relevant is general land. This is the land for which a right of occupancy or leasehold may be granted by the Commissioner for Lands upon application and fulfilment of certain conditions. Village land is administered at grass roots level for which a Certificate of Title can be granted to the holder(s).

The Village Land Act provides for a customary certificate of occupancy. This provision, presumably, was to provide those occupying village land with a mechanism for using it as collateral. Banks are reluctant, however, to take village land as collateral. Banks take collateral to secure loans with the understanding that in case of default the collateral can be sold to cover their loss. Collateral is therefore only as good as the market demand is for the asset. Sale of village land to someone outside the village requires that its status be changed from village to general. Depending on the size of the parcel this change could require approval at the village, district, region or even national level and may include presidential approval. The process makes village land illiquid and thus unsuitable for collateral. Some banks have, however, performed due diligence at the village level to ascertain whether local villagers would be willing to buy the land in case of repossession. In this case, the banks are restricting possible demand for practical reasons but this limits the value on resale. Regardless of the buyer the barriers that the Village Land Act raises with regard to resale make the policy anti-credit.
In theory, therefore, rights to land can be obtained by investors for varying periods. Anecdotal evidence suggests that it is easier said than done. Lack of transparency in land use, land rights and land ownership matters that affects small holders, large farmers, businesses and local and foreign potential investors. It is, indeed, considered by some to be among the most important factors that are considered by potential large scale investors.

4.1.4 Government policy for rice and general crop production

A supportive policy and regulatory environment has been evolving only gradually in Tanzania. The result has been a very low level of FDI in the country’s agribusiness sector. Several initiatives launched recently appear to be incompatible with the goal of strengthening private sector commitments to the agricultural sector in general. The effects of these emerging policies have yet to be fully determined.

In general government allocation of budgetary resources to the agricultural sector has been increasing gradually but from a very low base – the agriculture budget was just over 7 per cent of total government expenditure in 2010 which was an increase of over 30 per cent compared to the previous year. The budgetary commitment still remains, however, far below the required levels and is mostly committed almost exclusively to on-farm activities and almost completely disregards the demand end of farm to market chains. Neither market nor supply chain development receive any funding from government.

Government accepts the urgent need to channel funding to the agricultural sector but the proposed plans appear rather short sighted. Private institutions in the financial sector have consistently avoided lending to agriculture because of the risks involved. Should government decide to channel funding to agriculture in spite of these risks, rather than focussing on addressing them it may well squander the limited resources that it has. The Private Agricultural Sector Support Program (or PASS) works to encourage growth in the agricultural sector. It provides business plan support to entrepreneurs and then facilitates access to credit with the support of a guarantee that varies from 30 to 70 per cent. It is not a first-loss guarantee so lenders must exercise their recovery methods before PASS provides coverage.

The ASDS introduced in 2001 and the Agriculture Sector Development Programme (ASDP) introduced in 2002 are managed by MAFC. They are a sector wide framework for managing the institutional, expenditure and investment development of the sector. ASDP has not replaced existing planning and implementation mechanisms but aims to facilitate the process, emphasize priorities and monitor overall progress. ASDP covers a range of priorities that includes, among many others, irrigation and water management, better land husbandry, mechanization, storage and other postharvest activities, agroprocessing, community empowerment and agricultural information. Among the important constraints to achieving Tanzania’s agricultural growth targets that are acknowledged by ASDP are high transaction costs due to the poor state or lack of infrastructure and especially rural roads. A stated objective of the programme is to improve the quality and quantity of public investment in physical infrastructure through more devolved, technically sound planning and appraisal. The ASDP results framework should track development objectives against established indicators but it has proved difficult for outsiders to find official progress reports against these measures. Such a failure symbolizes a trend in which development plans are adequate or more than adequate but that implementation, monitoring and evaluation are unsuccessful.

‘kilimo kwanza’ is a strategy launched by President Kikwete in 2009. It aims to energize and coordinate government efforts to transform agriculture. The strategy is based on 10 pillars (see Box 1) each of which require political will, long term financing, and regulatory reform if they are to be successful. The initiative focuses on many issues including provision inputs, strengthening of the national Food Reserve Agency’s food reserve and improvement of the rural road network, irrigation and storage facilities. ‘kilimo kwanza’ is slowly gaining momentum. Value chain development for
soya bean would afford opportunities to leverage ‘kilimo kwanza’ through growth and by critical interventions that could help towards a more commercial agenda. To have a real and sustainable economic impact, however, supply chain development initiatives must operate in an environment in which government and the private sector support each other. In such a supportive environment bit trust and joint action are of fundamental importance. In the past opportunities for mutual problem solving and for open discussion and resolution between public and private sector have been limited. Priority actions could be directed at quality and standards enforcement, infrastructure development and trade policy.

As already indicated in Section 1.3, Government has prioritized rice through NRDS. This seeks to double rice production by 2018 to provide food security and the potential for export to neighbouring countries. NRDS aims to improve seed cultivars and input supply, the availability of irrigation, marketing, Research and Development (R&D) and agricultural credit (Box 7). The major programmes and policies include:

- fertilizer and seed subsidy and seed R&D;
- infrastructure development (irrigation and roads);
- an import tax of 75 per cent on milled rice for mainland Tanzania; and
- removal of the export ban during 2012.

**Box 7: The National Rice Development Strategy (NRDS)**

MAFC produced a draft National Rice Development Strategy in May 2008. The vision of NRDS is progressively to transform the existing subsistence dominated rice subsector into a commercial and viable production system. The general objective of the Strategy is to double rice production by 2018. Were NRDS to be successfully implemented it would contribute considerably to national food security and increase the possibilities for greater household incomes through production of more rice of better quality. Identified targets for NRDS are in eight strategic areas:

- improving seed systems and fertilizer distribution;
- developing improved varieties, production and integrated crop management options;
- postharvest activities and marketing;
- improving irrigation and water harvesting technology;
- enhancing access to and maintenance of agricultural equipment;
- improving capacity for technology development, training and dissemination;
- providing access to credit and agricultural finance; and
- promoting the medium and large scale processing industry.

Government has imposed and then rescinded an export ban on rice (and maize) on several occasions over a period extending to several decades. A purported reason for the imposition of these bans has been to overcome pressing food security concerns. Such a policy decision may be well intentioned and has certainly benefited consumers in Dar es Salaam but the law of unintended consequences may come into effect:

- it hurts smallholder farmers in food surplus regions because the loss of markets and customers resulting from the ban leads to a decline in farm gate prices and to a wider price differential between the farm gate and destination markets in other parts of Tanzania that are food deficient (as well as in the cross border regions in neighbouring countries);
- buyers in importing countries lose confidence in Tanzania as a reliable supplier;
- business uncertainty is created at both smallholder farmer and large private company level that contributes to discouraging future investment in the rice sector (when the opposite needs to occur);
- it encourages “black markets” as traders seek to avoid the export ban in order to
maintain export sales to neighbouring countries; and when a ban is lifted not all the various arms of government responsible for export approvals respond in a timely and coordinated manner.

A Common External Tariff (CET) of 75 per cent on imported rice – and for which TRA is the enforcing and collecting agency – was agreed to by the EAC in 2005. This had the effect of increasing by a factor of three the then prevailing Tanzanian tariff on imported rice. The principle behind this tariff charge is the protection of domestic producers from an envisaged flood of cheap rice imports. The CET applies, however, to mainland Tanzania only, as imports to Zanzibar are subject to a smaller tariff of 25 per cent or are even exempt from tariff altogether. The law of unintended consequences again comes into force as, whereas official imports have declined, there is evidence that unofficial imports through Zanzibar have not and importers are likely to be making significant profits (as are those who are simply avoiding paying the tariff through a spectrum of devious ways). The CET provides nominal protection to Tanzania’s rice industry but, in opposition to the export ban, it results in higher prices for consumers because it theoretically prevents access to the lower-cost global production.

The international donor community is developing a number of improved policy options that it will put forward for consideration by Government as alternatives to the export bans and the perceived excessive import tariffs. The quality of data available to help in defining and implementing policy is generally regarded as poor. This issue is also being addressed by the donor community. Ineffective or delayed implementation of policies and programmes due to a lack of resources is also a major factor that affects the effectiveness and credibility of Government. Many policies and programmes have been announced and implementation started yet output targets are not documented or met. This deficiency raises the question of the reliability of government agencies as partners in public private partnerships.

### 4.1.5 Irrigation development

Increasing the area of irrigated rice is integral to increasing rice productivity per unit area and thus increasing the total national rice output. Irrigation methods currently in use are predominantly rudimentary. Traditional irrigation covers 122 600 ha, improved traditional irrigation 25 500 ha and modern irrigation 35 800 ha. The small area being operated as modern irrigation systems is attributable to the absence of data for planning and the lack of funding, trained personnel and national coordination.

The National Irrigation Development Plan, to be completed by 2014, calls for “Removing Sectoral Constraints” and “Implementation of Irrigation Infrastructure” (Table 10). Progress to 2012 has been slow due mainly to poor institutional development and inadequate funding.

**Table 10 Area of rice irrigation in 2002 and projections for 2017**

<table>
<thead>
<tr>
<th>Water management system</th>
<th>Area (ha) in 2002</th>
<th>New developments (ha) to 2017</th>
<th>Total area (ha) in 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional and improved traditional</td>
<td>148 141</td>
<td>126 524</td>
<td>274 665</td>
</tr>
<tr>
<td>New (modern) small holder schemes</td>
<td>35 847</td>
<td>26 734</td>
<td>62 581</td>
</tr>
<tr>
<td>Water harvesting</td>
<td>7 934</td>
<td>60 241</td>
<td>68 175</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>191 922</strong></td>
<td><strong>213 499</strong></td>
<td><strong>405 421</strong></td>
</tr>
</tbody>
</table>

Source: SIPA 2010

Among the problems associated with the proposed increases in the area of irrigated rice are:
the amount of water available for irrigation is not precisely known given the lack of data for planning (there is much talk of “bountiful water” but this cannot be substantiated);

future competition for water for other uses could have an adverse effect on extraction rates for irrigation and therefore its sustainability;

the extent to which irrigation water availability is related to hydroelectric power schemes; and

current over commitment to irrigation could lead to major political problems and hardship for the people affected if water allocations have to be reduced.

4.1.6 Public infrastructure

It is commonplace to read that Tanzania is well endowed with public infrastructure including roads, rail, electricity, water, ports, telecommunications and markets. Whereas this may be generally true it is not the whole truth. The trunk roads that are tarmac (4000 km of Tanzania’s 85 000 km main road network was paved in 2009) are generally in fair to good condition. Such roads are often narrow, however, resulting in long journey times as traffic is held up by heavy haulage vehicles which leads to a high risk of accidents as drivers jostle for position. Legal restrictions on weight mean that many modern trucks cannot be loaded to capacity resulting in increased costs for farmers and traders. The innumerable checks on weight even on the same stretch of road result in further increases in costs due to the time wasted (Figure 25) and the need, often, to pay facilitation fees to secure a right of passage.

Figure 25 Heavy transport waiting their turn at a weighbridge on the Dar es Salaam-Morogoro road (Photo: Trevor Wilson)

Unpaved feeder roads in rural areas are often in poor condition resulting in further costs and delays due to axle and suspension damage. Many such feeder roads are impassable after heavy rains due to broken bridges and waiting times may be extended due to flooding. “Good tarmac roads” can reduce journey times to less than half compared to a dirt road, as for example on 240 km Tunduma-Sumbawanga link in 2012 which when completes is expected to lower journey times for a standard light car from more than six to less than three hours.

Poor rural (and some main) roads result in high to very high transport costs that are estimated to be four times the cost per tonne kilometre than on paved trunk roads. High road transport costs mean that rural producers do not gain the full benefits of high consumer prices and also result in higher input costs. Inadequate road infrastructure also has an impact on food security as it slows down or restricts the flow of food from surplus to deficit areas.
The rail system (Tanzania-Zambia Railway (TAZARA) and Tanzania Railways) is extremely inefficient and only TAZARA passes through the Southern Highlands. The Central Line from Dar es Salaam to Kigoma operates on two days per week at best. Many traders and transporters have thus changed their preferred mode of transport from the railways to the roads – resulting in a further lengthening of the duration of journey time for other users – for such heavy items as copper sheeting from Zambia. The northern line which connected Tanga to Arusha and to Kenya and with a branch to the Central Line (which was “cannibalized” from its service to the ill-fated and much derided Groundnut Scheme line from Mtwara to Nachingwea in the 1960s) has been defunct for many years.

Dar es Salaam and the newly opened Songwe International Airport some 20 km from Mbeya are the only airports that can take large transport aircraft and that could be used for export of perishable produce from the Southern Highlands in the foreseeable future. The Kilimanjaro International Airport in Arusha Region is another outlet for perishable produce from the northern areas of the country.

The electricity supply is patchy in distribution and most of the rural hinterland is not connected to the 33kVa grid. Supply is often intermittent and interrupted for several hours at a time. Telecommunications have improved vastly from the 1980s when it could take two days to get a connection from rural areas. Mobile services that also allow rapid money transfer need to be complemented, however, by high speed internet for larger files in order to improve business efficiency.

4.2 Related to Vertical and Horizontal Linkages and Value Chain Governance

4.2.1 Integration

The need for greater vertical and horizontal integration of the rice value chain is linked to a stronger consumer orientation and the need for innovation along the chain as a whole. These are the critical issues for improved chain performance. Past experience is that most initiatives have had only limited impact in bringing about change along and across the chain. Initiatives by several donors to organize smallholders into groups for warehouse receipts, technology transfer, capacity development, marketing and for increasing the awareness of farming as a business have been shown to be excellent incremental developments but they have been singularly unable to bring about transformation of the chain as a whole.

Improving the competitiveness and performance of Tanzania’s rice industry should engage the large scale private producers of rice with their expanding smallholder outgrower schemes. This view is strongly supported by a USAID strategic review and by the Bill & Melinda Gates Foundation study of the Tanzanian rice sector. It also conforms to ‘kilimo kwanza’ and the SAGCOT initiative. The companies involved are KPL, Mtenda Kyela Rice Supply and Kapunga Rice Farm. These large scale producers represent significant opportunities for transformation with smallholders because they:

- are major producers, millers, traders and distributors in their own right;
- have or shortly will have large smallholder outgrower or contract farmer schemes which they intend expanding (KPL intends to increase its current 1500 household smallholder scheme to 5000 by 2016 and is considering introducing a smallholder scheme for 3000 ha of new land in the Kihansi Valley south of its existing operation and is introducing new technology holders including new cultivars, fertilizers and small scale mechanization and ensuring that seed and fertilizer are available and delivered on time: in 2013-2015 Mtenda Kyela Rice Supply intend expanding their present outgrower base from 10 500 to 25 000 farmers, expand their geographical base to other districts and offer new services to smallholders.
- are building medium to large scale modern mills that, in addition to their own production will draw in additional supplies of paddy that can be appropriately dried, stored and milled properly (smallholders will have fewer post harvest problems and improved paddy quality will leading to improved returns); and
are providing or planning to provide additional services to smallholders including finance (at 8 per cent interest) for purchase of inputs in addition to offering a small price premium to smallholders who mill and market their paddy through them with all deliveries being paid for in cash.

These changes are about building trust, sharing information and adhering to strong social responsibility values. Modernization and increasing operational scale will improve competitiveness.

Large private sector companies offer the best opportunity to transform marketing in the value chain, particularly the vertical aspects, so that it is more consumer driven, there is greater information sharing and governance is improved. Increased rice production must be concurrent with expanded demand in both domestic and regional markets in adjacent countries. It is desirable to undertake and link many interventions to a commercial organization or value chain than to do them in isolation. There is then a greater likelihood of the interventions becoming permanent and sustainable.

4.2.2 Governance

A major issue in relation to vertical and horizontal linkages and value chain governance is risk aversion. This is an important social dynamic in Tanzania where the norms of contractual obligations are lacking. In the context of unwritten contracts and informal agreements it is often difficult to discern the dual responsibility of the contracting parties and the notion that they had to be bound to the terms of an agreement. The fragmentation of producers and traders means that parties are not forced to do business on a repeated basis. Market incentives lead to a substantial risk of side selling or sale of crops to a subsequent higher priced offer after what has appeared to be a negotiated sale. The large number of traders allows farmers who enter into supply contracts to engage in opportunistic behaviour. A chain based on such spot sales will have great difficulties in functioning effectively or engaging in value added activities.

In most functional contract enforcement systems a matrix of legal and extralegal incentives encourages behaviour that enables contract enforcement. Trust is a critical component of efficient value chains. In some communities in Tanzania there is a stigma associated with being the party who was vulnerable or foolish enough to be a victim of a breach. In rural communities especially, where rice growers produce at near subsistence levels, the breach of an agreement, far from being associated with dishonesty or untrustworthiness, is considered to be evidence of intellect and cunning, and may even be prized within the community.

Risk and uncertainty are addressed by the private sector through agreements. Where parties are assured that agreements are enforceable they are able to enter into more complex and value enhancing transactions. There is much progress to be made in improving contracting practices in the rice sector.

4.3 Related to Support Services

4.3.1 Overview

A service can be defined as a function performed or offered by a provider and used by a customer to the latter’s benefit. Numerous providers purport to operate in the rice value chain. These include government and private providers that supply inputs, extension services, research and development, training, financial services, market information and regulatory services. The public sector role has been elaborated in many documents that state that Government, in collaboration with other stakeholders, will provide core public services such as extension, information, research, training and infrastructure, policy formulation, a regulatory framework and protection of the environment. Public sector roles will be implemented by the Agricultural Sector Lead Ministries (ALM) including MAFC, Ministry of Livestock and Fisheries Development (MLFD), the Prime Minister’s Office-Regional
As a result of the 2009 Act there were amendments to and effective subsuming of the Food Security Act which was redefined as “An Act to establish an Authority to regulate production, processing and marketing of cereals and other produce; to provide for the national food security assurance mechanisms and for other related matters.”

4.3.2 Tanzania Rice Partnership (TARIPA)

The Tanzania Rice Partnership (TARIPA) was established in 2011 to provide focus and develop a critical mass of commercial value chain activities for improved rice productivity, marketing and processing.

TARIPA’s aims are to:

- develop a partnership framework to respond to rice value chain constraints and opportunities;
- build markets and small scale farmer capacity to produce rice to address key food security issues in the country, expand domestic production, improve competitiveness and increase value addition;
- scale up core value chain activities to catalyse significant small scale and large scale farmer and agribusiness development in the rice sector; and
- support commercial initiatives by building on current plans and activities to scale up through learning.

Organizations that are partners with the government in TARIPA include USAID, SAGCOT, the Japan International Cooperation Agency (JICA), Association of Kilombero High Quality Rice Growers Company Limited, RUDI, World Bank, Agrica Tanzania Ltd, FAO, KickStart, Syngenta, Tanzania Agriculture Partnership, Technoserve and the Norwegian Agency for Development Cooperation (NORAD).

4.3.3 The Cereals and Other Produce Board

The Cereals and Other Produce Board came into being on enactment of The Cereal and Other Produce Act (“An Act to make provisions for the establishment of the Cereals and Other Produce Board, for promotion and development of cereals and other agricultural produce and to provide for other related matters”) in 2009. The main functions of the Board (Section 6 (1)) are to carry out commercial activities and such other activities as are necessary, advantageous or proper for the development of the cereals and other produce industry. The Board may provide facilitation of (Section 6 (2)) (a) agricultural research on cereals and other produce; (b) extension services to growers and other dealers of cereals and other produce; (c) input services, including fertilizers and agrochemicals; (d) promotion of production, marketing, processing and storage of cereals and other produce; (e) the dissemination of information or data relating to cereals and other produce; (f) the promotion of technological advancement in cereals and other produce; and (g) the provision of assistance in the formation of farmers Co-operatives or Organisations. The Board shall (Section, subject to the provisions of this Act and any other written law, perform any commercial function or hold interest in any undertaking or project associated with cereals and other produce under this Act. The commercial functions referred to under subsection (1) shall include to (Section 7 (2)) (a) purchase and sell cereals and other produce at a competitive price; (b) import or export cereals and other produce; (c) process cereals and other produce; (d) provide warehousing services for cereals and other produce; (e) provide grain and other produce, cleaning, drying, weighing, grading and packaging services according to market

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2 As a result of the 2009 Act there were amendments to and effective subsuming of the Food Security Act which was redefined as “An Act to establish an Authority to regulate production, processing and marketing of cereals and other produce; to provide for the national food security assurance mechanisms and for other related matters.”
standards; and (f) perform any other commercial functions approved by the Minister for the
development of trade in cereals and other produce. It shall be the duty of the Board (Section 8 (2) in
the exercise of its powers and in the performance of its functions under this Act, to act in such a
manner as it appears to it appropriate for the purpose of promoting the quality and competitiveness
of the cereals and other produce industry within and outside Tanzania.

The Act also made provision (Section 15 (1)) for the establishment of a Cereals and Other Produce
Zonal Council in each of the seven agricultural zones of the country. The functions of Zonal Councils
(Section 15 (3)) are to: (a) promote cereal and other produce including formation of farmers
associations and other bodies in their respective areas; (b) act as a consultative forum for cereals and
other produce on price negotiations between farmers and buyers or traders of the cereals and other
produce; (c) establish and operate a market information system for cereals, other produce and
agricultural inputs in their respective areas; (d) promote the use of weights, measures and grading
standards for cereals and other produce; (e) collaborate with the Board and local government
authorities in provisions of agricultural education in respect to the cereals and other produce in their
areas of jurisdiction; (f) perform such other functions as the Council deems necessary for the
development of the cereal and other produce industry; and (g) prepare and promote zonal production
targets. The funds and resources of the Board (Section 17) are to consist of: (a) such sums of money
as may be appropriated by Parliament; (b) any money raised by way of loans, donations or grants
from, within and outside Tanzania; (c) any loan or subsidy granted to the Board by the Government
or any other person; (d) any money derived from commercial activities; and (e) such sums of money
or property which may become payable to or vested in the Board under this Act or any other written
law or in respect of any matter incidental to the carrying out of its functions.

The 2009 Act replaces an earlier one under which Crop Boards were restructured to resume regulatory
functions leaving commercial activities to the Cooperative Unions and the private sector. In the new
Act the private sector is once again, not only neglected, but also actively excluded. The general
opinion within the country is that the Board is not doing as much harm as it might do due to the
perennial lack of personnel, equipment and finances.

4.3.4 Value chain finance

Much of the rice chain has need of some capital and some recurrent financing. Up to early 2013 it
has been impossible for most chain participants to obtain finance. Many financial institutions provide
some credit for agriculture (see Section 3.3 and Table 6). NMB has a large agricultural portfolio
which could be extended to soya in the future. MFIs and SACCOS are possible sources of credit and
finance. Finance in and credit for the rice value chain is probably restricted by high interest rates,
high investment costs in some enterprises (especially irrigated production) and long periods of return
to the initial investment. There is also a lack of awareness among the stakeholders lower down the
chain of the need for investment. Some major characteristics of finance in the chain are:

- large traders are self-financing or have access via informal sources such that they can
dominate markets and squeeze out small operators who cannot pay immediately in
cash;
- there are no favourable financial support packages, preferential interest rate
programmes, or guarantee schemes that could ease access to finance;
- traditional small scale producers, traders and small processors, with few exceptions,
do not have the knowledge or skills to develop viable business plans or loan
applications and so far have received little support in this area; and
- there is no concept of integrated value chain finance such as a combined loan scheme
for interdependent small scale producers, traders, processors and retailers.

4.3.5 Insurance

As far as can be ascertained there are no insurance schemes for smallholder crops in Tanzania.
4.3.6 Research services

The purpose of research is to develop technologies that solve the problems affecting the industry in order to increase agricultural production and productivity and to augment its contribution to the national economy and improved livelihoods. Research is undertaken by various stakeholders. The National Agricultural Research System (NARS) comprises of public, parastatal and private bodies. The lead public institution for crops is the Department of Research and Training (DRT) of MAFC. Two semiautonomous institutions – TPRI under MAFC and CAMARTEC under MITM are also public bodies. SUA is the main academic research body. The University of Dar es Salaam (UDSM), Moshi University College of Cooperative and Business Studies (MUCCOBS), Mzumbe University, the Open University of Tanzania (OUT) and the Institute of Rural Development Planning (IRDP) also participate in some aspects of research and training. Private institutions for tea, coffee and tobacco undertake their own research. Many NGOs do some applied research and contribute to training. Five institutions that are part of the Consultative Group for International Agricultural Research (CGIAR) – IRRI, the Africa Rice Center (AfricaRice, formerly the West Africa Rice Development Association (WARDA), the International Institute of Tropical Agriculture (IITA), the Centro Internacional de Agricultura Tropical (CIAT) and the World Vegetable Research Centre (AVRDC) – work closely with the NARS: several other CGIAR centres have a smaller presence in Tanzania as does the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA).

To assist research centres to plan and implement research programmes relevant to each zone, the Client Oriented Research Management approach is employed, for which funding is provided by the zonal offices under the Zonal Steering Committees (ZSC) through the Zonal Agricultural Research and Development Fund (ZARDEF). Such committees are made up of Regional and District officials, researchers, extension officers and producers (who must comprise 50 per cent of the committee). Strategic research interventions theoretically follow a commodity value chain approach.

The long tradition of agricultural research has been jeopardized since Independence by reduced personnel and funding. In view of the importance of agriculture to the economy and its role in food security and human welfare Government’s allocation to research are seen to be pitiful. External donors have provided limited and intermittent funding for research but have failed to view their commitments as long term. As for extension services, the fractionation of research through devolution and the presumed advantages of zonal priorities have not assisted progress.

Farmers have limited knowledge of soya production and of its potential as food, feed and as a soil conditioner and improver. Research services have been weak in supporting soya bean production.

4.3.7 Extension services

Extension historically and traditionally has been financed entirely by the public sector. In general there has been far too much direct government involvement in the management of extension in spite of declining resources. Following independence, collaboration with the private sector, Faith Based Organizations (FBO) and other NGOs was minimal for many years. Since the 1990s, however, there has been some extension provision by the private sector as farmer led initiatives and private agri-businesses supplying fertilizers and agrochemicals have started to supplement public services.

The National Agriculture and Livestock Extension Policy and Implementation Guidelines (NALPIG) elaborate the extension policies in the 1997 Agriculture and Livestock Policy. NALPIG was prepared to advise staff in crop and livestock extension to the farmers of the mainland. Although they were prepared by the public service they were intended to assist anyone involved in extension including Government and NGO staff. NALPIG is being reviewed to incorporate institutional and policy reforms introduced since its first adoption. The new policy will seek to transform extension services so that they become participatory, demand driven, market oriented, cost effective, gender sensitive and are provided in a collaborative manner through involvement of a broad range of stakeholders.
General extension workers are trained at one of nine Ministry of Agriculture Training Institutes (MATI) located around Tanzania. MATIs provide training that results in the award of a Diploma or a Certificate in various aspects of crop production and crop protection. The MATIs generally have few teaching staff and staff houses and insufficient student accommodation. At most institutes teaching facilities are old and obsolete, infrastructure and equipment is in a poor state of repair and farm units are in need of rehabilitation and retooling for the practical training of students. They do, however, have land suitable for expansion and are strategically located to meet training requirements. Emerging aspects, or aspects that are likely to and should emerge, of the soya bean chain such as commercial production, private input supply and processing have specific training needs that require re-designing of training curricula and development of new ones.

Extension services to outgrowers connected to the large scale rice schemes are generally good throughout the production links from land preparation to postharvest. Outside these schemes, as indicated in Section 3.3, not enough producers have received extension advice. This is not surprising as, among other factors such as perceived need by producers and availability of transport and equipment for workers and there is a severe deficit of extension workers in comparison to the need (in 2009 just over 3300 public service extension workers were in post whereas the establishment was 15,000). The situation has not been improved by decentralization of extension from MAFC to local governments who are perennially short of funds. A further problem is that when extension is provided it is seldom holistic. The promotion of new varieties, for example, is not enough. In order to perform to their potential they need improved management, fertiliser and crop help chemicals but these are rarely promoted and even more rarely available. Linking smallholders as outgrowers to major schemes that are able to provide and deliver the whole package is an appropriate approach. There is clearly a need for massive additional training of field extension staff using MATIs and retraining of the existing ones to equip them with new technologies (and motivation actually to get out to the field).

In order to be fully effective in support of agricultural crop value chains the extension services should:

- be strengthened and help develop the private sector as part of ‘kilimo kwanza’;
- shift their focus to diversifying market demands and export opportunities;
- encourage effective farmer participation in the value chain to ensure competitiveness;
- empower farmers and encourage links with national and international organisations;
- develop new and promote current models with farmer trainers for the whole country;
- delegate ownership of extension services to farmers and make extension workers more accountable; and
- create a forum where public and private partners (including producers) come together to develop common policies and standards.

### 4.3.8 Seed supply

Until 2009 seed production and supply was restricted to public and quasi public bodies (see discussion in Section 4.1.2. Legislation and regulations, following Box 6). Liberation has not, however, greatly improved the situation. Certified seeds are, in principle, available from the ARIs and ASA. Both are engaged in multiplying and distributing improved varieties but the range of genetics is not always considered by farmers as the best (Box 8).

SA produces “Quality Declared Production” seeds which are recognized by TOSCI but supplies are limited although ASA claims to be able to provide adequate stocks of pre-basic and basic seed within a season. None of the 15 member companies of the Tanzania Seed Traders Association (TASTA) sells improved varieties of rice seeds. In collaboration with the district authorities, ASA claims to have an innovative approach to get seeds nearer to farmers and make them more affordable by using agro-dealers and ordinary village ‘duka’. Tanzanian farmers, small as well as large scale, do what farmers the world over do when faced with this problem – they find ways round it by swapping seeds and retaining their own better adapted varieties.
4.3.9 Market information

Linking farmers to markets is regarded as a milestone in promoting the growth of agriculture and the reduction of poverty. The World Bank sees enhanced smallholder competitiveness and facilitation of market entry as well as improved market access and the establishment of efficient value chains as important factors in agricultural development. Pillar 2 of the Comprehensive African Agriculture Development Programme (CAADP) is entitled “Market Access” and most African governments, including Tanzania, have been developing policies and programmes for linking farmers to domestic, regional and international markets. Improving the amount and reliability of agricultural data available to decision makers and stakeholders in value chains, including both the public and private sectors, is thus a precondition for formulating effective agricultural and rural sector investments that could help farmers to gain access to market opportunities.

Market data have been collected over many years but have seldom been put to good use and not seldom they have not been put to any use at all. The National Bureau of Statistics (NBS) is the main source of market data for Tanzania but quality remains a major concern. Much of the data collected (and sometimes collated) is inadequate to varying degrees as it lacks consistency over time and among sources and are is littered with gaps. Data collection is not embedded in the national psyche. There is lack of responsibility for verification in order to establish adequacy at all levels. In addition, data are often not readily accessible to users for a variety of reasons and, if available, are not always put to optimal use as they are not presented in a timely manner, are not in the form required and are not disaggregated to appropriate levels.

Box 8: Farmers’ Choice or Hobson’s choice?: rice genetic resources for Tanzania

Tanzanian smallholders have traditionally grown local varieties of rice that they have cultivated for tens or maybe hundreds of years. Many local named varieties – Supa, Behenge, Kula na bwana, Kalamata and others – are well adapted to the local physical and social environment: taste (“aroma”) is very important to local consumers. Most seeds planted by farmers are either their own stock or obtained by farmer to farmer exchange. Although well adapted to local conditions their genetic potential for yield is restricted to 1.0-1.5 tonnes per acre (2.5-3.7 t/ha). Rice is a crop with an enormous number of improved varieties that have been developed and released national and international research institutions. Paradoxically there is no great use of – nor demand for – improved seed by farmers. As rice is self pollinating the amount of new seed required is not great which acts as a disincentive to wholesalers and retailers.

A partial listing of varieties for Tanzania, not all current and not all necessarily released for use includes:

**Local cultivars:** Kihogo, Red Selection No. 7, Naro fupi, Supa Utafiti, Rangimibili, Dakawa (medium altitude), Kalalu, Mwangza

**NERICA varieties for upland rice:** 1, 3, 4, 7 and SWAB 450 in 2009 (and 13 in field evaluation)

- ‘NERICA’ = New Rice for Africa developed by Africa Rice from cross of *Oryza sativa* (Adian rice) and *Oryza glaberrima* (African rice), the former bing more productive, the latter more adapted to local conditions

**New varieties:** IR 22 (medium heavy yield, mid altitude), IR 54 (heavy yield, medium altitude), Katrin (heavy yield, medium altitude), IR 66, TXD-85 (non aromatic, low altitude), TXD-88 (non aromatic, low altitude), TXD 220, TXD 306 (‘Saro 5’ – aromatic, irrigated), Kalalu (Rice Yellow Mottle Virus (RYMV) resistant), Mwangaza (RYMV resistant), Dakawa (medium yield, medium altitude)

**New lines:** TXD-213, TXD-220, TXD-282, TXD-29

**IRRI introductions (2008):** IR05N 221 (‘Komboka’ = liberated, aromatic, 6.5-7.0 t/ha, matures 5-7 days earlier than Saro 5), IR03A 262 (‘Tai’ = eagle, not aromatic, 7.0-7.5 t/ha, matures in the range 7-14 days earlier than Saro 5)

Research institutions attempt to develop varieties that are “productive” and have good drought and disease tolerance. Farmers on the other hand, do not necessarily opt for “economic” characters. Tanzanian farmers prefer varieties with short to medium maturity periods, produce many tillers, mature uniformly, long translucent aromatic grains for their own use and marketing and (depending on the intended use) long – for thatching – or short – to resist lodging – straw. The implication for rice research in Tanzania is that breeding programmes should incorporate farmer-preferred attributes to address their preferences rather than to breed for absolute maximum yield when there is no strong farmer demand for it.
There is increasing awareness of the need for accurate, consistent, timely and accessible market information and movements. To this end the large scale rice producers and traders in Tanzania have constructed their own intelligence networks. In addition, several international organizations have set up or are setting up Market Information Systems (MIS). Among these relevant to the rice sector are:

- **Foodnet** – a partnership among IITA, CRS, ASARECA and Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA).
- The Famine Early Warning Systems Network (FEWS NET) -- funded by USAID, monitors trends in staple food prices in countries vulnerable to food insecurity and whose Price Bulletin provides a set of charts showing monthly prices in the current marketing year in selected urban centres that allows users to compare current trends with both five-year average prices (indicative of seasonal trends) and prices in the previous year;
- **Regional Agricultural Trade Intelligence Network (RATIN)** – a service of the Eastern Africa Grains Council (EAGC) that provides time-series data on prices, storage facilities, cross-border trade and food balances; and
- **ReliefWeb** – a specialized service of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

These networks undoubtedly provide useful information on prices and trends but are not necessarily easy of access or use by the individual small producer. In the meantime this last continues to obtain information on prices and demand from traditional sources – neighbours, local traders and local shops and markets. Inevitably, this means that he or she is a price taker and not a price maker.

### 4.3.10 Transport

Rice is grown in many parts of Tanzania. The country is reputed to be well endowed with road and rail communications but this is rather an overstatement of the reality as much of the Southern Highlands (and the major rice producing areas elsewhere in the country) still remains isolated from the trunk road system. The TAZARA line traverses the Southern Highlands but operates intermittently and is not considered as a transport option by the major traders and wholesalers. Rice usually moves from the production to the consumption areas as a full load of 100-kg sacks (although increasingly in smaller bespoke ready-for-retail packs of up to 25 kg) on heavy transport in lots of 16 tonnes to 32 tonnes Figure 26. Transport costs are computed as lump sums from Mbeya to Dar es Salaam or Arusha and average about TSh 80/kg. Transport from Iringa to Dar es Salaam is TSh 60/kg.

Figure 26 Lorries being loaded with rice for transportation to consumption area (note hand carts for local urban deliveries) (Photo: Trevor Wilson)
### 4.3.11 International and Non-Governmental Organizations

There are opportunities for donors to cosponsor or cofund trials of new business models as part of the sharing of risk and also to assist in the development of these models and their evaluation. The main steps include designing, piloting, evaluating, improving, implementing and the increasing the scale of operations. There is already considerable donor and NGO activity in the rice sector (Table 11). Considering its size, however, there is limited outreach with donor and implementer programmes particularly in the Southern Highlands. The main donors include JICA, USAID, the Swiss Agency for Development and Cooperation (SDC, through their Rural Livelihood Development Company (RLDRC) programme), The Aga Khan Foundation (AKF) and Oxfam GB. The Tanzania Staples Value Chain (NAFACA) programme has a strong focus on rice especially in the Southern Highlands. Other donors or agencies operating in the rice sector include Technoserve, EAGC, the UK’s Department for International Development (DFID) and several local and international NGOs including ACDI/VOCA, Services Health and Development For People Living Positively with HIV/AIDS (SHIDEPHA) and Voluntary Service Overseas (VSO). In September 2013 there is interest from the Bill & Melinda Gates Foundation and the Gatsby Foundation to participate in development of the rice sector in Africa and in Tanzania in particular. The Gates Foundation has recently completed two major studies reviewing the rice value chain in several African countries and the development of the rice sector in Tanzania with a view to investing in the sector – in a manner similar to that used in the Competitive African Cotton Initiative and the African Cashew Initiative – in partnership with private sector companies and obtaining “seed” funding from major donors.

#### Table 11 Summary of donor and implementer activity in the rice sector in Tanzania

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Promoters and Implementers</th>
<th>Location (Region)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize and rice</td>
<td>NAFACA; ACDI-VOCA, USAID, MAFC, DALDOs, Various local companies</td>
<td>SAGCOT, Kiteto (Manyara), Kongwa (Dodoma), Kilombero and Mvomero (Morogoro) Zanzibar</td>
</tr>
<tr>
<td>Maize and paddy</td>
<td>Technoserve, EAGC</td>
<td>Mbeya</td>
</tr>
<tr>
<td>Rice</td>
<td>AKF, DFID, VSO</td>
<td>Lindi and Mtwara</td>
</tr>
<tr>
<td>Rice</td>
<td>Oxfam GB, RUDI, SHIDEPHA</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>RLDC, ASA</td>
<td>ASAM VIWATA, ROKO Manyara, Morogoro, Tabora, Singida, Shinyanga</td>
</tr>
<tr>
<td>Rice</td>
<td>JICA</td>
<td>MEVT Arusha</td>
</tr>
</tbody>
</table>

Source: MMA 2012 and JICA

JICA has been associated with rice development in Tanzania for about 30 years. The Kilimanjaro Agricultural Training Centre (KATC), established in the 1980s, offers specialized short courses in agriculture with emphasis on improving irrigated rice. JICA, through KATC, provides 2-week training courses for farmers from more than 40 irrigation schemes. Following training the lead farmers become trainers on their own schemes and practice what they preach through demonstration plots. JICA has experts in place at Ukiliguru, Mkindo and Ifakara MATIs and at ARI-KATRIN for technical support. Gender issues are an important element of JICA’s approach. Testing and attempting to get certification of Nerica 4 rice on the mainland is also part of JICA’s efforts to improve the rice sector (it has been officially released in Zanzibar after successful field testing).
The “Food Security Implementation Plan” of USAID which targets Morogoro, Dodoma, Manyara and Arusha Regions has rice as one of its interventions. Proposals are in place for Dakawa and Kilombero schemes including closer cooperation with IITA in the multiplication and dissemination of improved rice varieties with a total budget of US$ 20 million. Funding is also provided to KPL to develop a microfinance envelope for provision of inputs to smallholder. The rationale for donors to participate in these projects is that it would provide a basis for linking smallholders to private sector projects that have the potential to provide long term and sustainable improvement in smallholder incomes.

Oxfam GB assists rice development in a total of 30 villages in Kahama and Bokombe Districts in Shinyanga Region under the Tanzania Agriculture Scale Up (TASU) programme but provides no direct funding to local communities. The targeted 6000 households are expected to have increased incomes through increased productivity. The programme assists SACCOS and Savings and Internal Lending Communities (SILC), trains self supporting producer groups to improve knowledge, skills, confidence and team work and helps to set up processing companies. Oxfam also works on improvements through in expensive technology, better soil and water efficiency, encouraging value addition, learning and sharing with others through Farmer Field Schools (FFS), exchange visits and forums. A value chain approach has been adopted by Oxfam which encourages beneficiary contributions and which also cooperates with private sector service providers and partners to implement the project.

The Aga Khan Foundation (AKF) is assisting a rice development project in Lindi Region working on the M4P (Making Markets Work for the Poor). The World Bank’s programme for strengthening agricultural productivity and growth in East Africa has approved US $ 30 million for Tanzania. The program will support Tanzania in the establishment of a Regional Center of Excellence for Rice which is aimed at improving rice production through better farmer access to improved varieties, management practices and postharvest technology.

5. VISION AND STRATEGY FOR IMPROVED COMPETITIVENESS AND GROWTH

5.1 Vision

In 2013 the rice sector is a major part of agriculture that provides employment and food to the people of Tanzania. It contributes to household incomes as well as boosting the national economy with its contribution to both agricultural and overall GDP. Its performance is far from optimal but most of the solutions to the problems are known. If the solutions can be applied then the Vision could be:

**By 2025, a sustainable, environmentally sensitive, more productive, more competitive and more profitable rice sector will deliver increased output for internal consumption and for export and contribute to reduced poverty, improved food security and a better quality of life for all Tanzanians**

5.2 Strategic Issues Synthesis

5.2.1 Existing policies, strategies and programmes

A series of Components and Activities (Table 12) are being developed NRDS based on the main policy, strategy and programme activities organized and put in place by Government (Table 13).
### Table 12 Components and strategic foci of the Tanzania National Rice Development Strategy (NRDS)

<table>
<thead>
<tr>
<th>Component</th>
<th>Strategic foci</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving accessibility of improved varieties</td>
<td>(I) production of basic and certified seeds; (ii) strengthening seed distribution networks; (iii) supporting on-farm seed production; (iv) creating awareness on available seeds of rice varieties to farmers; and (v) strengthening the capacity of public and private seed companies.</td>
</tr>
<tr>
<td>and seed systems</td>
<td></td>
</tr>
<tr>
<td>Fertilizer marketing and distribution</td>
<td>(I) strengthening the capacity of agro-dealers to access input credits and agribusiness skills; (ii) ensuring proper use of inputs for increased rice production and productivity; and (iii) production and distribution of inputs vouchers.</td>
</tr>
<tr>
<td>Irrigation and investment in water control</td>
<td>(I) rehabilitation of traditional irrigation schemes; (b) construction of new irrigation schemes; and © construction of rain water harvesting and storage structures.</td>
</tr>
<tr>
<td>technologies</td>
<td></td>
</tr>
<tr>
<td>Access to and maintenance of agricultural</td>
<td>(I) promoting agroprocessing of paddy and value addition technologies; (ii) strengthening capacity of postharvest and rural based agroindustries; (iii) enhancing access to and use of improved postharvest, rural travel and transport, processing, storage and marketing technologies; and (iv) facilitating private sector investment in medium scale processing.</td>
</tr>
<tr>
<td>equipment</td>
<td></td>
</tr>
<tr>
<td>Postharvest and marketing</td>
<td>(I) promote warehouse receipt systems that ensure producers get better prices for their produce, earn more and have reliable sources of food and income; (ii) establish strong, self supporting producer groups in which members support each other to produce, process, package and market their rice; (iii) build producers’ knowledge, skills, and confidence to improve their bargaining power; and (iv) establish wider links in the rice trade so as to be able to compete in regional and world market.</td>
</tr>
<tr>
<td>Research, technology dissemination and</td>
<td>(I) genetic resources conservation and use; (ii) soil health and soil fertility management; (iii) crop management and protection options; and (iv) advisory services (extension, NGOs and agribusiness).</td>
</tr>
<tr>
<td>capacity building</td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
</tr>
</tbody>
</table>

Source: adapted from MAFC 2009
### Table 13 Existing policies, strategies and programmes of relevance to the rice value chain

<table>
<thead>
<tr>
<th>Policy / Strategy / Programme</th>
<th>Launch year</th>
<th>Objectives / areas of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania Development Vision 2025 (TDV)</td>
<td>In progress</td>
<td>Tanzania of 2025 should be a nation imbued with five main attributes: high quality livelihood; peace, stability and unity; good governance; a well educated and learning society; and a competitive economy capable of producing sustainable growth and shared benefits. Among others, the vision aims at developing a diversified and semi-industrialized economy with a substantial industrial sector, macroeconomic stability, a growth rate of 8% per annum or more, and an adequate level of physical infrastructure. It is also envisaged that fast growth will be gained while effectively reversing current adverse trends in the loss and degradation of environmental resources (such as forests, fisheries, fresh water, climate, soils, biodiversity) and in the accumulation of hazardous substances.</td>
</tr>
<tr>
<td>National Strategy for Growth and Reduction of Poverty II (NSGRP II or MKU/KUTA, for its acronyms in Swahili) <a href="http://www.tz.undp.org/docs/mkukutall">http://www.tz.undp.org/docs/mkukutall</a> draft.pdf</td>
<td>2005</td>
<td>Builds on four key fundamentals: (i) efficient use and development of factors of production, including human capital/resources, (ii) strengthening and establishing well functioning institutions and markets, (iii) provision of infrastructure, and (iv) ensuring good economic governance, on four strategic areas: (i) Providing targeted subsidy to selected food crops, identifying and promoting modern farm technologies and providing support for increased utilization of improved technologies for crop and livestock production; (ii) Identifying research activities and promoting food storage technologies/facilities and enhancing agroprocessing as well as environmentally friendly technologies and practices especially for rural areas; (iii) Improving road network connectivity to facilitate flow of agricultural produce (outputs); and (iv) Improving stock management and monitoring of food situation in the country</td>
</tr>
<tr>
<td>Kilimo Kwanza (Agriculture First)</td>
<td>2009</td>
<td>Aims to accelerate agricultural transformation through fostering the modernization and commercialization of agriculture, mainstreaming Government planning processes, allocating sufficient resources, mobilizing increased investments, and the mobilization of the private sector</td>
</tr>
<tr>
<td>Agricultural Sector Development Strategy (ADDS)</td>
<td>2001</td>
<td>Aims at creating an enabling environment for improving agricultural productivity and profitability, improving farm incomes, thereby contributing to reducing rural poverty and ensuring household food security. It focuses on productive and gainful agriculture: subsistence agriculture must become profitable smallholder agriculture, and the spotlight must switch from public institutions to farmers and agribusiness</td>
</tr>
<tr>
<td>Agricultural Sector Development Program (ASDP)</td>
<td>2002</td>
<td>Provides the government with a sector-wide framework for overseeing the institutional, expenditure and investment development of the agricultural sector. Aims at enabling farmers to have better access to and use of agricultural knowledge, technologies, and market infrastructure all of which contribute to increased productivity, profitability and income, thereby enhancing food security. At district level these interventions are implemented through District Agricultural Development Plans (DADPs) based on target communities and district development priorities. The ASDP, among others, promotes more control of resources by beneficiaries, pluralism in service provision, and resource transfer based on the evaluation of its efficiency.</td>
</tr>
<tr>
<td>Integrated Industrial Development Strategy (IIDS 2025)</td>
<td>??</td>
<td>Provides guidance in the implementation of the Sustainable Industrial Development Policy (SIDP) 2020 objectives under the newly prevailing economic environment and to realize the targets stipulated by TDV 2025. Aims to build up internationally competitive business environments and promote enterprises to make the industrial sector an engine of the economic growth. It particularly promotes agricultural development-led industrialization to support successful implementation of Kilimo Kwanza and equitable growth of the regions.</td>
</tr>
<tr>
<td>Agricultural Marketing Strategy (AMS)</td>
<td>??</td>
<td>Contributes towards attaining TDV 2025, NSGRP, Kilimo Kwanza and the Millennium Development Goals (MDGs). AMS aims at promoting a competitive, efficient and equitable agricultural marketing system, including supporting the availability of international accredited laboratories and testing equipments for the introduction and monitoring of appropriate quality standards</td>
</tr>
<tr>
<td>Rural Micro, Small and Medium Enterprise Program (MU VI)</td>
<td>???</td>
<td>Supports agricultural and agroindustrial development in six target regions, Coast, Tanga, Manyara, Mwanza, Iringa and Ruvuma. One important contribution of MUVI is provision of information to the rural poor entrepreneurs in value chain coordination</td>
</tr>
<tr>
<td>The Southern Agriculture Growth Corridor of Tanzania (SAGCOT)</td>
<td>In process</td>
<td>Aims at attracting private investment into agriculture in ways which are socially and environmentally responsible. Addresses constraints related to uncertain policy environment, the development of private and public partnerships and availability of affordable and long-term finance. Investments are promoted along trade routes linking Tanzania to Zambia serving, within Tanzania, the Coast, Morogoro, Iringa, Rukwa and Mbeya regions. Focuses on discrete geographical areas (&quot;clusters&quot;) within the corridor where there are opportunities to establish a critical mass of profitable small and large operators</td>
</tr>
</tbody>
</table>

Source: 3ADI, 2011
5.2.2 **SWOT analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local aromatic varieties with strong demand</td>
<td>Low yields due to use of local varieties and little uptake of technology (seed, fertilizer, crop health products, water management)</td>
</tr>
<tr>
<td>Climate, soil and water suitable for rice</td>
<td>Intensive labour use due to low mechanization</td>
</tr>
<tr>
<td>Large scale producers with outgrower schemes offer good possibilities for increased efficiency and higher output</td>
<td>Inadequate storage in rural areas (WRS)</td>
</tr>
<tr>
<td>High yielding varieties with desired producer and consumer traits available</td>
<td>Value chain weakly developed and fragmented: operates on supply push and not demand pull basis</td>
</tr>
<tr>
<td>Strong support from international community (JICA, USAID, RLDC/SDC, etcetera) and international research institutes (CGIAR centres)</td>
<td>Limited added value (branding, grading, no economic use of hulls/bran, no traceability)</td>
</tr>
<tr>
<td>Government committed to development (Centre of Excellence, NRDS)</td>
<td>Lack of trust in business transactions, little respect for formal contracts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huge and increasing internal demand especially for preferred varieties</td>
<td>Inability of seed agencies (ASA and private) to provide adequate quantities of new generation seeds</td>
</tr>
<tr>
<td>Young and increasingly affluent population will add further demand</td>
<td>High interest rate and unstable macroeconomic environment (fluctuating exchange rates and inflation)</td>
</tr>
<tr>
<td>Strong external demand for Tanzanian rice in neighbouring countries</td>
<td>Climate change may affect some aspects of production</td>
</tr>
<tr>
<td>Vastly increased output through use of technology (seed, fertilizer, crop health products, water management)</td>
<td>Rice diseases universally present and possibly increasing</td>
</tr>
<tr>
<td>Adding value to basic product via differentiation</td>
<td>Imports have negative effect on local primary production and value added processing</td>
</tr>
<tr>
<td>Organization of segments or of whole value chain into groups/associations to strengthen powers (“empowerment”)</td>
<td>Frequent policy changes (including export bans and import tariffs) reduce confidence in both internal and external markets in Tanzania as a reliable partner</td>
</tr>
<tr>
<td>Agricultural is national priority - ‘kilimo kwanzu’ (agriculture first)</td>
<td></td>
</tr>
</tbody>
</table>

5.3 **Value Chain Competitiveness Strategy**

Some of the strategic elements that will certainly improve the ability of the value chain to compete include:

- improving knowledge, skills and information throughout (and before) the chain (agriculture in schools, producer training, business training);
- promotion and strengthening of groups and associations from primary producers through to retailers to encourage horizontal and vertical integration and to provide the industry with a “voice”;
improving existing and providing new physical infrastructure to support the growth of profitable agriculture and generate employment;

development, equitable deployment and retention of human resources especially in the research and extension services;

promotion and adoption of science and technology including research and development for the production of high quality and nutritious food;

strengthening and introduction of investment in general infrastructure and physical market infrastructure;

collection, collation and transparent and widespread dissemination of market information including volumes of trade and prices;

promotion of fair and competitive farm gate prices;

strengthening of the links between farmers and markets and higher up the chain for domestic, regional and global markets;

promoting private sector investment and encouragement of public-private partnerships (although great faith is placed in many quarters on privatization and private sector investment as a *sine qua non* of any future development it is not a panacea);

increasing the amount and improving the quality of value added processed products;

ensuring that Tanzania’s rice products are produced (and can be verified as having been produced) to international standards of food safety;

facilitating access to finance and credit including links to capital and short term markets and introducing insurance for crop failure;

mitigating and adapting to the effects of climate change (research programmes to improve existing and develop new technologies);

promotion of measures to cushion producers from the effects of drought and strengthening of the Famine Early Warning System (FEWS);

ensuring that land tenure arrangements for both traditional producers and those wishing to invest in large scale production are favourable to long term investment; and

implementing the National Strategy on Agriculture and HIV/AIDS to support increased production.

### 5.4 Proposed Strategy Components

Strategic areas that need to be dealt with in the overall agricultural context include:

- sustainable and environmentally sensitive use of land, water and other natural resources;
- public, private and public/private sector collaboration in productive investments and financing;
- improvement of the productivity and efficiency of production, marketing and processing;
- rendering more effective the support services including research, extension, training and dissemination of information;
- general capacity building and empowerment all along the chain;
- chain governance, regulatory and institutional arrangements; and
- cross-cutting and cross-sectoral issues.

Interventions should be designed as an integral part of the country’s participatory processes and fit within the general framework of the NRDS (Table 12) and current policies, strategies and programmes for agriculture and rural development (Table 13). Further consultations will be needed with a broad range of stakeholders before any progress can be made but there are four strategies (Table 14) that need immediate attention if the rice sector is to fulfil – and fulfil in an effective and timely manner – its potential.
### Table 14 Components of a strategy to improve the performance of the Tanzanian rice sector

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Rationale</th>
<th>Tactics and operations</th>
</tr>
</thead>
</table>
| Increased rice production             | (I) Response to increased local and export demand                           | (1) Large private sector companies focussing on production and processing and trading companies  
|                                       | (ii) Need to increase competitiveness and profitability                     |   a) Increased irrigated production;  
|                                       | (iii) Management and dissemination of knowledge                             |   b) Increased private sector investment particularly by investors with strong Corporate Social Responsibility credentials and willing to include smallholder outgrower schemes in their business model;  
|                                       |                                                                            |   c) Commercially focussed research and development plus availability of seeds of improved cultivars;  
|                                       |                                                                            |   d) Development of smallholder outgrower schemes and provision of a range of services e) Review existing business models and develop new and improved models.  |
|                                       |                                                                            | (2) Smallholder interventions  
|                                       |                                                                            |   a) Improved input (high yielding varieties + matched fertilizer) supply and adoption and specific planting and weeding technologies as a package (approach is supported by IRRI research in Tanzania and Australian RiceCheck experience as key to increasing yield);  
|                                       |                                                                            |   b) Mechanization of production;  
|                                       |                                                                            |   c) Farmer training and skills development as part of outgrower schemes or separately (e.g. though RUDI) (technical production plus business skills including contracting – need to incorporate “action learning”);  
|                                       |                                                                            |   d) Block farms for greater efficiency;  
|                                       |                                                                            |   e) Group working for extension to facilitate learning and adoption of new technology;  
|                                       |                                                                            |   f) Formation of smallholder producer groups to negotiate with private companies in relation to outgrower schemes;  
|                                       |                                                                            |   g) Easier access to finance and credit (including insurance)  |
| Increased rural storage               | (I) Overcome need to sell paddy at harvest when prices are lowest;          | a) Community based grain storage (promoted via development of associated credit schemes using stored grain as collateral) (not WRS in strictest sense but provide many of same benefits to both farmers’ storing grain and to bank providing credit);  
|                                       | (ii) Smooth out price fluctuations within the year;                         | b) Commercial grain storage (not available in Tanzania but in other countries provided by industry cooperatives or private sector and is investment with a slow rate of depreciation financed by long term capital);  
|                                       | (iii) Clear picture of amount of stored paddy and help address food security concerns; | c) Reporting stored grain volumes to improve management  |
|                                       | (iv) Prevent theft and losses due to vermin                                | d) Expanded use of WRS  |
|                                       | (v) WRS provides basis for smallholders to be paid up to 60 per cent of paddy value on receipt |                                                                            |
| Improving functioning and performance of value chain and marketing | (I) Rice sector not vertically integrated, supply driven, transaction based and operates on informal basis without contracts; | a) Large private sector companies have ability to transform value chain over time due to their size and moving downstream to take on additional chain functions including milling/processing and distribution to wholesalers.;  
|                                       | ii) Vital that domestic and export markets developed as production increases; | b) Training stakeholders in value chain management;  
|                                       | iii) need to increase added value                                           | c) Consumer research (understanding consumers and their preferences, how, where and frequency of purchase in order to provide basis for more focussed approach to domestic market development including segmentation, branding and other value adding approaches.  
|                                       |                                                                            | d) Training to build trust and greater understanding amongst stakeholders of advantages of contracting business transactions along the chain (requires long term approach and participation of many stakeholders to help bring about changes in attitudes and behaviours as informal transactions add costs to the chain to offset risk);  
|                                       |                                                                            | e) Understanding regional export markets, competition, customer preferences and needs for market development. |
Tanzania Southern Highlands Food Systems

Industry wide body or alliance  
With possible exceptions of TARIPA and FAO’s Rice Working Group there is no formal industry wide body involving all stakeholders in value chain, focusing on strategic development of rice sector and engaging government on policy issues affecting sector

Scoping need for and role of industry wide body or alliance including focus on industry development issues (new cultivar evaluation, other R&D, infrastructure development, funding, input to government policy affecting rice sector and funding body itself

Enhancing the business enabling environment  
Business enabling environment needs to be attractive for successful and profitable operation of rice sector and all those operating within it whether smallholder farmers, SME providing services or large private operators involved in production, milling and distribution

Tanzania Policy Project (SERA) of USAID, World Bank and other donors are already actively involved in providing advice on these issues to Government

TUTAFANYA NINI? WHAT FAO CAN DO

It needs to be accepted that there must be realism about what can be delivered and achieved in the rice sector in Tanzania. The focus needs to be on a small number of strategic areas that can be expected to make a real difference.

A strong private sector is required. This is consistent with both ‘kilimo kwanza’ and the SAGCOT initiative. It is considered that this will deliver better and more sustainable outcomes for the development of the rice sector than a purely government focussed approach. This is because resources will be allocated to deliver a more commercial, market focussed outcome and there will be greater accountability.

Government policy issues relating to the enabling environment are of clear importance. Other parties, however, are already strongly involved in this arena. The SERA project of USAID covers this area so there is a limited role for FAO.

It needs to be accepted that the present number of farmer cannot be maintained. World experience is that the number of farmers has reduced over time but that fewer farmers will cultivate individually larger areas. These larger farms will become more mechanized and will adopt new technology in order to become more competitive. Agriculture is already the “default setting” for Tanzania’s youth and more and more are leaving the land to move to the city. In this it no different from many other developing countries where there are similar lack of activities that add value to basic products in rural areas nd a weak manufacturing base in the urban ones.

The models and approaches to be incorporated into a rice development strategy must not maintain the status quo. One business model will not fit every situation. Opportunities to use a number of different models that have been successful in other countries need to be critically examined and if found suitable to be promoted and adopted.

Wherever possible interventions should be linked to the market and not just applied in isolation as a single item.

The role played by FAO and the programmes it undertakes or promotes need to be part of a broader collaborative approach working with the private sector, service providers and donors and such Government entities as are committed to a strong private sector focus. FAO must also identify its unique point of difference and skill set in terms of what it offers to development.
FAO has strength and experience in training and in understanding agroindustry business models in developing countries. In view of this the focus should be on training and specific consultancy studies on critical issues:

**Training:**
- training and skill development for smallholders in topics from agriculture to business management and including contracting (a training needs analysis needs to be undertaken before finalizing the programme but it should incorporate “action learning” so that training is linked to operations in the field, farming as a business and the market;
- training stakeholders in value chain management (for example as in the practical approach of “Walking the Chain” to introduce value chain thinking in agrifood chains in developing countries (see Collins and Sun 2012 in Annex 4); and
- training to build trust and greater understanding amongst stakeholders of the advantages of contracting business transactions along the chain.

**Consultancy studies to research critical issues related to agroindustry development (in order of priority):**
- review of smallholder outgrower schemes and develop solutions to current bottlenecks and consider new outgrower business models that may be applicable to the rice sector through a review of smallholder outgrower schemes in other sectors and in other countries;
- review of how to increase the provision availability of grain storage in rural areas, draw on experiences elsewhere and develop a course for action;
- scoping study to identify value adding opportunities and how these can be implemented, especially in rural areas; and
- research in Dar es Salaam on consumer preferences for and use of rice, how and where they purchase and how often in order to provide a more focussed approach to domestic market development including market segmentation, pack size, branding and other approaches to adding value (it is important to understand what consumers’ value and that the study be undertaken in close consultation with the major private rice producing companies and could be undertaken as part of a higher academic degree).